

**Productivity Surveys of Geese, Swans and
Brant
Wintering in North America 2004**



**Department of the Interior
U. S. Fish and Wildlife Service
Division of Migratory Bird Management
Arlington, Virginia**

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Productivity Surveys of Geese, Swans and Brant
Wintering in North America - 2004

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Waterfowl productivity analyses are conducted annually to monitor selected goose, swan, and brant populations. Methods used include satellite imagery of nesting habitat, inventory of staging concentrations, determination of percent juvenile and family size in fall and winter concentrations, as well as analysis of harvest data.

This report summarizes productivity data obtained during fall 2004 and winter 2005, and is grouped according to Flyway and population. Data for 2005 will be forthcoming in April 2006.

Thanks to all biologists and volunteers for their dedication to collect data reported in this document. Without your tireless efforts to record this data, the documentation of the knowledge and traditions of waterfowl would not be possible. Thank you to the many supervisors both public and private to allow your employees to collect this information so we can better understand the outcome of the past year's production efforts of waterfowl.

A special thanks to the Flyway Coordinators (Page iii) for their willingness to accept this additional burden in their already full schedules, to assemble each Flyway's data in one location for publication and for their efforts to strive for accuracies in the presentation of the data sets.

Any inaccuracies in the representation of the data in this report are my responsibility and I would appreciate notification of errors so we may make the necessary corrections. Comments and suggestions are always welcome in our effort to make the report more presentable!

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2004 PRODUCTIVITY REPORT SUMMARY

SPECIES	% PRODUCTIVITY ESTIMATE	TYPE OF YEAR	% CHANGE FROM 2003
Atlantic Flyway			
Greater snow geese	12.1	Below Average	-23.4
Atlantic Brant	13.1	Below Average	-23.8
Tundra Swan	16.1	Above Average	209.0
Mississippi/Central Flyway			
MC Lesser snow geese			
LA pre-season	No data		
LA in-season	19.0	Below Average	-24.1
TX pre-season	No data		
TX in-season	12.7	Below Average	-26.1
MC Greater white-fronted geese	31.7	Below Average	-20.8
WCF Lesser snow geese	14.9	Below Average	-27.7
WCF Ross's geese	10.5	Below Average	-50.2
Pacific Flyway			
Lesser snow geese (Mixed flocks)	25.3	Average	18.2
Lesser snow geese Wrangel Island	No data		
Ross's geese	13.2	Below Average	-20.0
Greater white-fronted geese	30.0	Above Average	158.6
Tule Greater white-fronted geese	29.2	Above Average	43.1
Tundra swan	19.2	Below Average	-13.9
RMP Trumpeter swan	23.7	Average	3.0
Alaska			
Pacific Brant		Below Average	
Fall	18.2		33.0
Winter	11.6		78.0
Trumpeter swan	17.0	Below Average	-8.0
Emperor geese		Below Average	
Fall ground counts	21.9		83.0
Fall aerial counts	11.1		19.0
Cackling Canada geese	No data		
Dusky Canada geese	27.8	Above Average	286

TITLE Waterfowl Productivity Surveys for the Atlantic Flyway - 2004

SPECIES SURVEYED Greater Snow Goose (Chen caerulescens atlanticus)
Atlantic Brant (Branta bernicla bernicla)
Tundra Swan (Cygnus columbianus)

COOPERATORS: Maryland Department of Natural Resources, Fish, Heritage,
and Wildlife Service
New Jersey Department of Environmental Protection,
Division of Fish, Game, and Wildlife
New York State Department of Environmental Conservation
North Carolina Wildlife Resources Commission
Pennsylvania Game Commission
U. S. Fish and Wildlife Service
Alligator River/Pea Island National Wildlife Refuge
Chincoteague National Wildlife Refuge
Back Bay National Wildlife Refuge
Bombay Hook National Wildlife Refuge
Mattamuskeet National Wildlife Refuge
Pocosin Lakes National Wildlife Refuge

COMPILED BY: Carl Ferguson, Division of Migratory Bird Management

ABSTRACT:

Atlantic Flyway productivity surveys for greater snow geese, Atlantic brant, and tundra swans were conducted during November and December of 2004 and January of 2005. The data indicates that productivity for greater snow geese decreased -23.4 %, decreased for Atlantic brant -23.8 %, and increased, +209 % for tundra swans from 2003. These waterfowl species were surveyed in five States and on six National Wildlife Refuges within the Atlantic Flyway.

METHODS:

The procedures followed in conducting the surveys are contained in the draft Standard Operating Procedures for Productivity Surveys of Geese, Swans, and Brant, USFWS.

Greater Snow Geese

Productivity Appraisals: A total of 33,748 snow geese were observed and aged in New Jersey, Maryland, North Carolina, and Pennsylvania in 2004 (Table 1.). The percent of immature birds observed was 12.1 %. This is a decrease from 2003, which was -15.8 percent. The number of young per family group observed was 1.7.

Atlantic Brant

Productivity Appraisals: During the fall of 2004, a total of 27,622 brant were aged in New Jersey and New York (Table 2.). The percent of juvenile birds observed in 2004 was 13.1 percent as compared to 17.2 percent in 2003; a decrease of -23.8 %. The number of young per family group was 2.0 in 2004, a decrease from 2.1 in 2003.

Tundra Swan

Productivity Appraisals: A record total of 12,981 swans were aged in Pennsylvania, New Jersey, Maryland, and North Carolina, with the majority of the observations coming from North Carolina. The percent of immature swans observed was 16.1 per cent, a +209 percent increase from 2003. Juvenile swans observed per family group were 2.4. Swans arrived during the normal time period this fall on the Atlantic Flyway.

DISCUSSION:

Snow Geese: Production dropped slightly from 15.8 % immature birds observed in 2003 to 12.1 % immature in 2004. Young observed per family group was 1.7, which was a slight increase from last year (2003). The total number of birds observed, (33,748) was the highest since 1997, mainly resulting from an increase of observations from the staff at Bombay Hook National Wildlife Refuge, and increased observations from Chincoteague National Wildlife Refuge.

Atlantic Brant: For 2004, production (13.1%) as indicated by percent of immature birds decreased somewhat from 2003 (17.2 %). Young observed per family group was 2.0, also decreased slightly from 2003 (2.1).

Tundra Swan: This species showed a large increase from 2003 (+209 %). Young observed per family group was 2.4, an increase from 1.3 in 2003.

A higher than average number of tundra swans (12,981) and the third highest number of Atlantic brant (27,622) were observed and recorded for this productivity index in 2004. Productivity surveys should be continued in 2005. This production index should be watched closely for snow geese because of their population dynamics during the last decade, and also for Atlantic brant as there is no breeding ground survey for this species in the North. Snow goose observations rebounded to their third highest total (33,748) since 1976. Efforts should continue to maintain and expand the geographic coverage for these species. Productivity workshops will be conducted

during early fall 2005.

<u>Species</u>	<u>Productivity 2004 - Percent Immature</u>			<u>Mean 1976-2003</u>
	<u>2004</u>	<u>% Change from 2003</u>	<u>Type of Year</u>	
Greater Snow Geese	12.1 %	-23.4 %	Below Average	22.5 %
Atlantic Brant	13.1 %	-23.8 %	Below Average	19.5 %
Tundra Swan	16.1 %	+209 %	Above Average	13.7 %

LITERATURE CITED:

U.S. Fish and Wildlife Service, Standard Operating Procedures for Productivity Surveys of Geese, Swans and Brant (Draft) 52 pp

ACKNOWLEDGMENTS:

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 - Back Bay National Wildlife Refuge – M. Bogue & D. Stolley
 - Chincoteague National Wildlife Refuge - E. Savage
 - Mattamuskeet National Wildlife Refuge - M. Legare
 - Pocosin lakes National Wildlife Refuge – W. Stanton

Table 1. - Historical Population and Productivity Data for the Atlantic Flyway - Greater Snow Geese

Year	Number Families		Families		Other		Total Adults		Total Immature		Total Birds	Percent Immature	Ave. Young Per Family
	Families	Adults	Immature	Adults	Immature	Adults	Immature	Adults	Immature				
1976	149	298	358	31179	3057	31477	3415	34892	9.8	2.4			
1977	387	744	874	4995	918	5739	1792	7531	23.8	2.3			
1978	307	614	597	13165	3057	13779	3654	17433	21.0	1.9			
1979	304	594	739	4579	1119	5173	1858	7031	26.4	2.4			
1980	412	784	1104	7205	3479	7989	4583	12572	36.5	2.7			
1981	495	629	983	13662	1955	14291	2938	17229	17.1	2.0			
1982	423	842	1095	8890	1046	9732	2141	11873	18.0	2.6			
1983	885	1751	2954	8066	6435	9817	9389	19206	48.9	3.3			
1984	273	538	734	7544	2317	8082	3051	11133	27.4	2.7			
1985	947	1745	2506	8585	2136	10330	4642	14972	31.0	2.6			
1986	72	142	150	12665	152	12807	302	13109	2.3	2.1			
1987	796	1518	2273	93327	4349	94845	6622	101467	6.5	2.9			
1988	455	900	1165	8926	3299	9826	4464	14290	31.2	2.6			
1989	955	1827	1956	10578	3374	12405	5330	17735	30.1	2.0			
1990	835	1524	1956	18709	2691	20233	4647	24880	18.7	2.3			
1991	1151	2234	2696	18298	4577	20532	7273	27805	26.2	2.3			
1992	301	549	281	10684	248	11233	529	11762	4.5	0.9			
1993	2096	4079	5396	8711	4896	12790	10292	23082	44.6	2.6			
1994	669	1313	927	15791	1721	17104	2648	19752	13.4	1.4			
1995	753	1423	1402	11287	1149	12710	2551	15261	16.7	1.9			
1996	991	1826	1964	14655	5283	16481	7247	23728	30.5	2.0			
1997	1268	2406	3111	19625	5762	22031	8873	30904	28.7	2.5			
1998	610	1307	1406	30528	10080	31835	11486	43321	26.5	2.3			
1999	152	458	159	20562	440	21020	599	21619	2.8	1.0			
2000	1443	2778	2245	13597	6402	16375	8647	25022	34.6	1.6			
2001	399	803	529	9160	2154	9963	2683	12646	21.2	1.3			
2002	460	890	245	18984	325	19874	570	20444	2.8	0.5			
2003	113	223	182	7528	1268	7751	1450	9201	15.8	1.6			
2004	484	968	839	28691	3250	29659	4089	33748	12.1	1.7			
1976 - 2003 Mean	646	1241	1428	16124	2989	17365	4417	21782	22	2			
2004 % change from 2003	328.3	334.1	361.0	281.1	156.3	282.6	182.0	266.8	-23.4	5.5			
2004 % change from mean	-25.1	-22.0	-41.3	77.9	8.7	70.8	-7.4	54.9	-45.1	-19.0			

Table 2. - Historical Population and Productivity Data for the Atlantic Flyway - Atlantic Brant

Year	Number Families		Families		Other		Total		Total Birds	Percent Immature	Ave. Young Per Family
	Families	Adults	Immature	Adults	Immature	Adults	Immature				
1976	104	208	246	6312	393	6520	639	7159	8.9	2.4	
1977	162	311	379	8200	3177	8511	3556	12067	29.5	2.3	
1978	144	284	308	10362	361	10646	669	11315	5.9	2.1	
1979	703	1381	1956	7233	4024	8614	5980	14594	41.0	2.8	
1980	622	1232	1637	15247	6733	16479	8370	24849	33.7	2.6	
1981	523	1040	1249	11444	2124	12484	3373	15857	21.3	2.4	
1982	429	1002	1009	14863	3853	15865	4862	20727	23.5	2.4	
1983	292	581	780	12172	5293	12753	6073	18826	32.3	2.7	
1984	335	655	789	11310	2456	11965	3245	15210	21.3	2.4	
1985	283	560	674	14701	2179	15261	2853	18114	15.8	2.4	
1986	105	210	263	19690	506	19900	769	20669	3.7	2.5	
1987	313	601	801	11634	3599	12235	4400	16635	26.5	2.6	
1988	274	542	667	12068	3856	12610	4523	17133	26.4	2.4	
1989	466	905	1174	12957	2514	13862	3688	17550	21.0	2.5	
1990	387	732	838	15777	1176	16509	2014	18523	10.9	2.2	
1991	710	1265	1396	5845	911	7110	2307	9417	24.5	2.0	
1992	124	242	212	19510	230	19752	442	20194	2.2	1.7	
1993	1679	3237	3371	15042	1544	18279	4915	23194	21.2	2.0	
1994	619	1203	1210	18029	968	19232	2178	21410	10.2	2.0	
1995	1242	2470	2788	11556	1071	14026	3859	17885	21.6	2.2	
1996	830	1637	1826	19523	2011	21160	3837	24997	15.3	2.2	
1997	1502	2888	3299	19683	1479	22571	4778	27349	17.5	2.2	
1998	1006	1990	2621	15545	2942	17535	5563	23098	24.1	2.6	
1999	185	364	320	36369	235	36733	555	37288	1.5	1.7	
2000	1305	2542	2769	15098	3155	17640	5924	23564	25.1	2.1	
2001	811	1571	1738	15308	3787	16879	5525	22404	24.7	2.1	
2002	637	1214	1157	55047	3045	56261	4202	60463	6.9	1.8	
2003	1022	1983	2184	19460	2276	21443	4460	25903	17.2	2.1	
2004	848	1,672	1,663	22,337	1,950	24009	3613	27622	13.1	2.0	
1976 - 2003 Mean	600.5	1173.2	1345.0	16070.9	2353.5	17244.1	3698.5	20942.6	19.1	2.3	
2004 % change from 2003	-17.0	-15.7	-23.9	14.8	-14.3	12.0	-19.0	6.6	-23.8	-4.8	
2004 % change from mean	41.2	42.5	23.6	39.0	-17.1	39.2	-2.3	31.9	-31.3	-11.65	

Table 3. - Historical Population and Productivity Data for the Atlantic Flyway - Tundra Swan

Year	Number Families		Families		Other		Total		Total Immature	Total Birds	Percent Immature	Ave. Young Per Family
	Families	Adults	Immature	Adults	Immature	Adults	Immature	Adults				
1976	18	42	21	7309	541	7351	562	7913	7.1	1.2		
1977	144	285	315	2672	412	2957	727	3684	19.7	2.2		
1978	6	10	8	433	176	443	184	627	29.3	1.3		
1979	15	27	24	1280	102	1307	126	1433	8.8	1.6		
1980	19	36	35	1807	182	1843	217	2060	10.5	1.8		
1981	16	32	37	1000	410	1032	447	1479	30.2	2.3		
1982	144	281	282	4656	357	4937	639	5576	11.5	2.0		
1983	448	889	880	5152	616	6041	1496	7537	19.8	2.0		
1984	240	467	516	6682	1248	7149	1764	8913	19.8	2.2		
1985	716	1313	1433	7397	1251	8710	2684	11394	23.6	2.0		
1986	235	464	311	10405	723	10869	1034	11903	8.7	1.3		
1987	109	203	179	7199	629	7402	808	8210	9.8	1.6		
1988	247	566	471	8172	1051	8738	1522	10260	14.8	1.9		
1989	461	883	791	10856	1306	11739	2097	13836	15.2	1.7		
1990	297	541	562	9872	629	10413	1191	11604	10.3	1.9		
1991	139	261	219	3002	237	3263	456	3719	12.3	1.6		
1992	125	241	197	11070	292	11311	489	11800	4.1	1.6		
1993	434	858	418	10462	1582	11320	2000	13320	15.0	1.0		
1994	497	1099	635	3115	365	4214	1000	5214	19.2	1.3		
1995	234	475	268	8458	519	8933	787	9720	8.1	1.1		
1996	922	1800	1114	11956	420	13756	1534	15290	10.0	1.2		
1997	846	1707	697	8974	174	10681	871	11552	7.5	0.8		
1998	1411	2325	1697	8675	345	11000	2042	13042	15.7	1.2		
1999	700	1244	1097	10993	326	12237	1423	13660	10.4	1.6		
2000	676	1375	577	5117	160	6492	737	7229	10.2	0.9		
2001	947	1904	1147	10169	166	12073	1313	13386	9.8	1.2		
2002	1276	2783	1149	20402	878	23185	2027	25212	8.0	0.9		
2003	694	1276	929	31927	887	33203	1816	35019	5.2	1.3		
2004	535	1,829	1,301	9,067	784	10896	2085	12981	16.1	2.4		
1976 - 2003 Mean	429.1	835.3	571.8	8186.1	570.9	9021.4	1142.6	10164.0	13.6	1.5		
2004 % change from 2003	-22.9	43.3	40.0	-71.6	-11.6	-67.2	14.8	-62.9	209.6	81.7		
2004 % change from Mean	24.7	119.0	127.5	10.8	37.3	20.8	82.5	27.7	18.3	59.7		

Title: **Mid-Continent White-fronted Geese Productivity Report - 2004**

Submitted by: Fred Roetker, Flyway Biologist, Lafayette, LA

Abstract: Productivity appraisals of Mid-Continent White-fronted Geese were conducted in Texas and Louisiana. The percentage of immature birds was 31.7. The average number of young per family was 1.68.

Methods: The procedures used in conducting these appraisals were developed by Lynch (1969). The Texas data was collected during the period October 25-27, 2004. Eight state and federal cooperators put forth an excellent effort to obtain representative data near Eagle Lake, Garwood, and El Campo, Texas. In Louisiana, the sampling occurred during October, November, and December, 2004; and January and February, 2004 in southwestern Louisiana near Gueydan and Lake Arthur.

Results: The sample of 14,726 birds indicated 31.7% were immature. The average young per family was 1.68, based on 715 families observed. The 2003 data reflected 40.0% immature (17,658 records) and 1.91 goslings per family.

Discussion: Similar to the trend evident the last five years, significant numbers of whitefronts were three to four weeks behind their normal arrival dates in southwestern Louisiana. Hunting pressure was heavy across the region. Many hunters suggested that they put more effort into goose hunting in 2004 due to the lack of ducks.

Literature Cited:

Lynch, J. J. 1969. Appraisals of annual productivity and mortality among geese, swans, and other birds. Annual Report, Part II and Appendix A. U. S. Fish and Wildlife Service. 26pp.

U. S. Fish and Wildlife Service, 1977. Standard Operating Procedures for Productivity Surveys of Geese, Swans, and Brant (Draft) 52 pp.

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Cooperators:

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Texas Parks & Wildlife

David Lobpries

Table 1. Historical Mid-Continent White-fronted Goose age ratios (% Imm.) and average young per family (Y/F). Data for 1979 and after are weighted by flock size.

Year	n	% Imm	n*	Y/F
1956		33.8		1.18
1957		46.3		1.80
1958		42.8		2.30
1959		51.6		2.58
1960		50.4		2.83
1961		19.7		2.04
1962		36.4		2.08
1963		49.7		2.82
1964		28.9		2.37
1965		36.8		2.75
1966		43.8		2.92
1967		36.2		2.57
1968		34.4		2.80
1969		41.2		2.87
1970		44.5		2.72
1971		34.4		2.36
1972		28.4		2.29
1973		42.8		2.70
1974		32.6		2.37
1975		41.9		2.29
1976		21.2		2.18
1977		38.1		2.35
1978		8.9		1.49
1979		33.0		3.18
1980		34.0		2.26
1981		36.6		2.04
1982		29.9		1.80
1983		38.0		2.15
1984		44.7		1.79
1985		30.9		1.62
1986		29.5		1.61
1987		24.6		1.39
1988		28.5		1.52
1989		32.2		1.87
1990		29.2		1.69
1991		29.4		1.76
1992		21.2		1.61
1993		29.2		1.45
1994		33.0		1.70
1995		40.2		1.82
1996		40.7		1.52
1997		30.8		1.46
1998		34.7		1.88
1999		37.2		1.83
2000		36.9		1.96
2001		32.1		1.73
2002		34.1		1.94
2003	17658	40.0	1289	1.91
2004	14726	31.7	715	1.68
Mean ^a		34.9		2.1
2004				
% Change from 2003		-20.8		-12.0
% Change from Mean		-9.2		-19.5

^a Mean excludes 2004
n = number of geese sampled.
n* = number of families sampled

Title: Lesser Snow Goose Productivity Surveys for the Central and Mississippi Flyways – 2004

Submitted by: Fred Roetker, Flyway Biologist, Lafayette, LA

Abstract: Louisiana lesser snow geese (blue phase dominant) provided the following productivity data: in-season, 19.0% immature birds, young/family 1.25; In Texas (white phase dominant) the following results were indicated: in-season 12.7% immature birds, and young/family 1.42.

Methods: The procedures used in conducting these appraisals were developed by Lynch (1969) and are outlined in the Standard Operating Procedures for Productivity Surveys of Geese, Swans, and Brant (Draft) 1977. Louisiana in-season data was collected from November, 2004 through March, 2005. The Texas in-season data was collected during November and December on Anahuac National Wildlife Refuge in Chambers County.

Results: Lesser snow geese wintering in Louisiana are primarily blue phase, ranging from 90-95% blue at Delta NWR located at the mouth of the Mississippi River to 65-80% blue in southwestern Louisiana, or west of the Atchafalaya River. The mid-continent lesser snow geese which winter in other regions of the Central and Mississippi Flyways, except New Mexico, 90-95% white, indicate the white phase to be dominant, 55-65%. The 11,768 in-season records from fifteen flocks showed 19.0% to be immature geese with an average young/family of 1.25 goslings. The 2989 records from Texas during the goose season indicated 12.7% to be immature birds with an average young/family of 1.42 goslings.

Discussion: The trend for significant numbers of snow geese to arrive late in southwestern Louisiana continued in 2004. Similar to 2003, birds appeared to be four to five weeks late. Only limited numbers of snow geese were present when the hunting season opened in both states, November 6. As a result, no pre-season productivity data was collected in either state.

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U. S. Fish and Wildlife Service, 1977. Standard Operating Procedures for Productivity Surveys of Geese, Swans, and Brant (Draft) 52 pp.

Acknowledgments:

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Table 1. Historical Lesser Snow Goose age ratios (% Imm.) and average young per family (Y/F) for Louisiana and Texas.

Year	Pre-Season LA			In-Season LA			Pre-season TX			In-season TX		
	n	% Imm.	n*	n	% Imm.	n*	n	% Imm.	n*	n	% Imm.	n*
1984		31.4		22.3				--			26.5	
1985		33.4		28.9				--			24.5	
1986		20.0		12.6				--			8.4	
1987		34.9		24.0				--			12.2	
1988		35.6		28.5				--			25.2	
1989		34.5		29.4				--			27.4	
1990		29.0		23.0				--			20.1	
1991		30.3		29.1				31.4			17.7	
1992		8.6		8.1				10.8			2.3	
1993		29.4		32.9				--			22.8	
1994		29.5		29.6				27.7			28.3	
1995		37.1		30.5				--			--	
1996		30.6		27.5				--			34.5	
1997		27.3		31.4				28.7			--	
1998		25.6		29.4				--			40.2	
1999		26.3		24.2				23.5			25.2	
2000		32.5		23.9				--			28.5	
2001		29.2		30.2				--			26.9	
2002		--		22.5				--			19.6	
2003		--		25.0		648		--			17.2	39
2004		--		19.0		562		--			12.7	26
Mean ^a		29.2		25.7				24.4			22.6	
2004										1.9		
% Change from 2003				-24.1							-26.1	
% Change from Mean				-25.9							-43.9	

Mean^a 2004 1.8 1.5 24.4 1.9 22.6 1.7
 % Change from 2003 -8.8 -26.1 -7.8
 % Change from Mean -16.1 -43.9 -16.8

^a Mean does not include 2004
 n = number of geese sampled.
 n* = number of families sampled

WESTERN CENTRAL FLYWAY LIGHT GOOSE PRODUCTIVITY REPORT – WINTER 2004-2005

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ABSTRACT: Productivity appraisals of the Western Central Flyway Light Goose Population (WCFP) were conducted in 3 U. S. States and 1 Mexican State between 6 December 2004 and 24 January 2005. These surveys yielded a combined population estimate of 228,065 light geese. We estimate the WCFP was composed of 63.2% adult snow/blue geese and 36.8% adult Ross's geese. The blue morph comprised 3.7% of the adult snow goose population. The average percentage of immatures in our samples was 14.9% for snow/blue geese and 10.5% for Ross's geese. The average number of immatures per snow goose family was 1.9. Productivity of snow geese was 27.7% lower than 2003 and was 26.6% lower than the 1984-2003 average. The productivity of Ross's geese was 50.2% and 39.7% lower than 2003 and the 1984-2003 average, respectively. Unfavorable weather in the central and western Arctic during the nesting period likely contributed to below average production observed during our annual wintering ground surveys of the WCFP.

Surveys concerning flock characteristics of light geese have been conducted on migration and wintering grounds in the Central Flyway since 1978. The procedures for these appraisals are from Lynch and Singleton (1964) and Lynch (1969). The method of flock sampling was described by Drewien (1988). Flock size, species composition, color morph, adult:immature ratio, and family size are collected at major migration and wintering areas in Colorado, New Mexico, Texas, and Chihuahua, Mexico. Habitat conditions and specific information on surveys in the Middle Rio Grande Valley, NM and in Chihuahua are reported in Appendix A.

RESULTS

Above average precipitation (150-200% of normal) was reported for southeastern Colorado, New Mexico, and western Texas during the period from November – February, 2004-2005. Although the drought in the southwestern United States appeared to be easing, western New Mexico and northeastern Colorado remained on the National Drought Mitigation Center's 1 March drought monitor map as areas in moderate drought, primarily because reservoir water levels remain low (National Drought Mitigation Center 2005). Drought effects on summer-seeded crops remained obvious in southeastern Colorado with localized crop failures and crop disaster relief still being distributed to farmers. However, the winter wheat crop throughout the survey region appeared in good condition and more advanced than we have seen in several years, a reflection of the recent increase in precipitation. In Texas, approximately 53% of the playas in the panhandle contained water compared to <1% during winter 2003-2004. Across the U.S. portion of the WCFP wintering range, temperatures during November-February were 1-3° F above normal.

The 2004-2005 productivity appraisals for the WCFP involved Colorado, Texas, and New Mexico and the Mexican State of Chihuahua and included 18 concentration areas (Fig. 1). Light goose flocks were surveyed during the following dates: New Mexico, 9-10 December (Bosque del Apache NWR), 8-9 December (Bitter Lake, Las Vegas, and Maxwell NWRs), 15-17 December (Rio Grande Valley, Appendix A); Texas, 6-7 December; Colorado, 13-17 December; and Chihuahua, 12-24 January (Appendix A).

A 14.1% sample ($n = 32,089$) of the total light goose population estimate was classified by species, age, and color morph (white or blue)(Table 1). Adult snow/blue and Ross's geese comprised 63.2% and 36.8% of the sample, respectively (Table 1, Fig. 2). The proportion of adult Ross's geese was 37.3% higher than 2003 (26.8%) and 87.8% higher than the 1984 - 2003 average (19.6%) in the WCFP (Table 2). The total 2004 WCFP estimate was 18.7% and 18.8% higher than the 2003 estimate and the 1984 - 2003 average, respectively (Table 2, Fig. 3).

Lesser Snow Geese

Immature snow/blue geese accounted for 14.9% ($n = 3,719$) of 25,001 snow/blue geese sampled (Table 1). Of 21,282 adult snow/blue geese sampled, 3.7% ($n = 781$) were blue morph (Table 1). Average family size was 1.9 immatures/family ($n = 991$ families), which was the same as the 2003 estimate, but was 5.0% lower than the 1984 - 2003 average (2.0) (Table 2).

We observed 20 snow goose neck-collars during the survey, 14 in Texas and 6 in Colorado (Table 3).

Ross's Geese

Immature Ross's geese represented 10.5% ($n = 1,155$) of the 11,042 Ross's geese sampled (Table 1). This was 50.2% and 39.7% lower than the 2003 estimate (21.1%) and the 1984 - 2003 average (17.4%), respectively (Table 2).

We observed 26 Ross's goose neck-collars during the survey this year including 2 in Colorado, 20 in eastern New Mexico, and 4 in Texas (Table 3).

DISCUSSION

The WCFP breeds primarily in the central and western Canadian Arctic and have large nesting colonies near the Queen Maud Gulf and on Banks Island. Reports from the Arctic breeding grounds indicated that snow cover in the Queen Maud Gulf melted earlier than normal, but light geese arrived later than normal possibly due to extensive snow cover to the south. The late arrival delayed nest initiation and unfavorable weather conditions during the nesting period resulted in poor production from the Queen Maud Gulf nesting colonies. Late spring phenology and similar poor weather conditions during incubation occurred at the Banks Island nesting colony and reduced nest initiation and poor production was observed (U.S. Fish and Wildlife Service 2004). Our results

coincide with those predictions for both Ross's and snow goose production and confirm biologists' forecasts.

This year we surveyed light goose wintering areas between Lubbock and Hereford, Texas. The surveys were hampered because above average precipitation made roads impassable much of the time during December. Three small samples ($n = 42$, $n = 30$, $n = 216$) were collected, but not included in Table 2 because of concerns about sample bias. Small flocks can be biased towards productive or non-productive birds or towards one species (Lynch 1969). We found that the largest sample taken from a flock of 900 ($n = 216$) contained 37% immature snow geese and 29% immature Ross's geese. While these findings do not match our findings across the region or the expectations from the breeding grounds, they may represent smaller flocks of families ahead of the larger wintering flocks. Both the proportion of blue phase snow geese (9.3%) and the proportion of Ross's geese (20.4%) within the flock coincided with larger samples taken from the northern Texas panhandle. We hope to continue surveys in this region in the future. Time, personnel, and financial constraints do not permit us to expand into all areas of the wintering range, but would improve our assessment of the WCFP.

This survey serves as the only standardized check on species composition for the WCFP. It has become especially important to monitor these species given the population explosion of light geese during the last decade and the implementation of harvest strategies in 1999 to control their populations.

I want to thank the agencies and field stations listed as contributors for their support of this survey. Thanks to Erv Boeker for volunteering his time to help collect data. Thanks to landowners in Texas and Colorado for allowing access to their land. I thank Tim Moser and Rod King for comments that helped improve this report.

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Table 1. Distribution and flock characteristics of the Western Central Flyway Light Goose Population, winter 2004-05.

Location	Population estimate ¹	Flock composition by area, state/country, and flyway										Snow/blue family size			
		Species composition					Snow/blue goose age ratios and flock composition					Ross's goose age ratios		No. of families	Avg. imm./family
		n	% snow/blue ²	% Ross's ²	Adult snow/blue	Immature snow/blue	% Imm. snow/blue	% Blue ²	Ad.	Imm.	% Imm.	Imm.	Imm.		
COLORADO															
Lamar Area	42,000	2,069	72.1	27.9	1,083/88	369/9	24.4	7.5	454	66	12.7	32	2.2		
Rocky Ford Area	8,000	0													
Colorado total	50,000	2,069	72.1	27.9	1,083/88	369/9	24.4	7.5	454	66	12.7	32	2.2		
TEXAS															
Cactus Lake	37,000	3,246	73.8	26.2	1,798/266	324/25	14.5	12.9	732	101	12.1	19	1.8		
Lake Rita Blanca	30,000	2,945	46.4	53.6	1,064/78	300/8	21.2	6.8	1,317	178	11.9	11	2.3		
Texas total	67,000	6,191	61.0	39.0	2,862/344	624/33	17.0	10.7	2,049	279	12.0	30	2.0		
NEW MEXICO															
Bitter Lake NWR	3,500	1,277	18.3	81.7	210/3	46/0	17.8	1.4	953	65	6.4	0	-		
Bosque del Apache NWR ³	31,350	12,658	63.1	36.9	10,602/259	1,773/24	14.2	2.4	3,539	415	10.5	479	1.8		
Maxwell NWR	115	0					(10.3-16.7) ⁴	(1.0-3.3) ⁴					(1.6-2.0) ⁴		
Las Vegas NWR	1,000	0													
New Mexico total ⁵	35,965	13,935	58.2	41.8	10,812/262	1,819/24	14.3	2.4	4,492	480	9.7	479	1.8		
MEXICO															
Mexico total ⁶	75,100	9,894	66.8	33.2	5,744/87	831/10	12.6	1.5	2,892	330	10.2	450	1.9		
Western Central Flyway total ⁷	228,065	32,089	63.2	36.8	20,501/781	3,643/76	14.9	3.7	9,887	1,155	10.5	991	1.9		

¹ Estimate was from partial ground surveys and is independent of the official winter waterfowl survey.

² Generated using adult component only.

³ Separate samples for snow and Ross's geese used. J. F. Voelzer only appraised snow geese; Species composition and Ross's goose data calculated using data from Appendix A, Table 2 - Rio Grande Valley, NM. Because of this, species composition can not be calculated directly from data in this table. Snow goose data for Bosque del Apache NWR weighted for differences in flock size from 14 different flocks sampled.

⁴ Range of data collected on 14 flocks appraised at Bosque del Apache NWR by J. F. Voelzer.

⁵ See footnote 3. Species composition and Ross's goose data calculated using data from Appendix A, Table 2 - Rio Grande Valley, NM. Because of this, species composition can not be calculated directly from data in this table.

⁶ See Appendix A for flock characteristics by individual survey area.

Table 2. Population estimates and productivity data for the Western Central Flyway Light Goose Population, winters 1960-2004.

Year	Population estimate ¹	Average flock composition				% Immature		Snow/blue family size	
		No. geese sampled	% Snow/blue ²	% Ross's ²	% Blue ²	Snow/blue	Ross's	Avg. imm./ family	No. families sampled
1960	5,826 ³								
1961	12,349 ³				2.5				
1962	7,997 ³				3.0				
1963	44,402 ³				2.3	17.0			
1964	23,321 ³				1.8	12.0			
1965	38,167 ³								
1966	231 ³				2.3				
1967	123 ³				1.3	50.0			
1968	5 ³				1.1				
1969	0 ³				0.8				
1970	34,806 ³				0.6				
1971	35 ³				1.0	47.0			
1972	0 ³				1.7	40.0			
1973	1,719 ³				1.0	13.0			
1974	16,341 ³				2.5	52.0			
1975	42,330				0.5	21.7			
1976	66,326				0.5	61.1			
1977	72,617				2.5	42.0			
1978	85,390 ³	5,787			1.0	39.3			
1979	94,283 ³	6,776	86.7	13.3	2.2	20.6	21.6		
1980	98,996 ³	8,833	85.6	14.4	3.5	35.2	30.7		
1981	75,073	5,705	84.4	15.6	2.6	25.1	22.1		
1982	141,702	2,512				12.7			
1983	36,493	8,988	71.1	28.9	1.8	39.9	19.2		
1984	63,043 ³	15,453	93.6	6.4	1.8	24.9	22.1		
1985	176,713	25,217	91.9	8.1	1.4	30.1	22.9		
1986	121,395	23,721	85.3	14.7	0.9	3.7	12.2	2.0	378
1987	120,655	29,548	86.5	13.5	1.1	19.4	8.1	2.1	2,185
1988	134,352 ³	27,241	86.2	13.8	1.1	27.3	16.3	2.3	1,603
1989	172,813	31,689	89.1	10.9	1.7	21.0	27.2	2.1	1,214
1990	166,900	28,321	84.2	15.8	1.3	21.5	12.3	1.9	1,297
1991	91,739 ³	22,918	84.8	15.2	1.8	11.7	11.4	1.8	812
1992	139,162	21,629	80.1	19.9	1.0	15.6	8.0	1.9	850
1993	196,700	35,538	76.4	23.7	1.7	34.2	20.3	2.4	1,414
1994	161,290	26,531	74.4	25.6	1.3	18.9	13.8	2.0	916
1995	193,915	33,648	75.5	24.5	2.4	22.3	18.2	2.1	1,302
1996	183,290	37,005	82.0	18.0	1.7	29.0	20.9	2.4	2,019
1997	218,658	41,183	70.2	29.8	2.4	15.8	14.0	1.8	1,364
1998	240,410	43,771	75.4	24.6	1.9	31.8	24.9	2.1	2,202
1999	309,861	44,072	78.9	21.1	3.1	27.3	27.4	2.2	2,161
2000	221,736	40,270	75.9	24.1	2.3	12.6	12.8	1.8	1,066
2001	211,640	37,783	76.0	24.0	1.9	9.8	18.7	1.8	816
2002	236,775	47,868	69.0	31.0	1.8	7.8	14.9	1.6	841
2003	192,132	33,537	73.2	26.8	2.0	20.6	21.1	1.9	1,140
2004	228,065	32,089	63.2	36.8	3.7	14.9	10.5	1.9	991
Average, 1975-83 ⁴	72,424	6,434	82.0	18.1	2.2	28.8	23.4	-	-
Average, 1984-03 ⁵	192,003	32,347	80.4	19.6	1.7	20.3	17.4	2.0	1,310
% change from 2003	18.7	-4.3	-13.7	37.3	85.0	-27.7	-50.2	0.0	-13.1
% change, '84-'03 avg.	18.8	-0.8	-21.4	87.8	117.6	-26.6	-39.7	-5.0	-24.4

¹ Population estimates preceding 1978 are from the Mid-winter Waterfowl Survey, estimates following 1978 are from ground and aerial estimates made during productivity surveys. Coverage in Chihuahua, Mexico initiated in 1984.

² Generated using adult component only.

³ Incomplete survey coverage.

⁴ Average for surveys prior to the initiation of the Mexico survey in 1984. Population estimate average only includes years of complete survey coverage. Flock characteristic averages include 1978 - 1983 (years with a sample).

⁵ Average reflects the addition of the Mexico productivity survey that began in 1984. Population estimate average only includes years of complete survey coverage. Flock characteristic averages include all years from 1984 to 2003.

Table 3. Location and number of neck-collared lesser snow and Ross's geese observed during productivity surveys in Colorado, Texas, and New Mexico, December 2004¹.

Location	Snow					Ross's		Total
	Red ²	Black ³	Yellow ⁴	Green ⁵	Blue ⁶	Blue ⁴	Yellow ²	
COLORADO								
Lamar Area		3	1		2	2		8
Rocky Ford Area								0
NEW MEXICO								
Bitter Lake NWR						10	10	20
TEXAS								
Rita Blanca Res.		1	2				4	7
Cactus		2	8		1			11
TOTAL	0	6	11	0	3	12	14	46

¹ See Appendix A for location and number of collars seen in the Rio Grande Valley, NM and Chihuahua, Mexico.

² Baffin Island, W. Hudson Bay, La Perouse Bay, Wrangel Is.

³ Western Arctic

⁴ Central Arctic E.

⁵ Akimiski Is., Cape Henrietta Maria, Southampton Is.,

⁶ Alaska

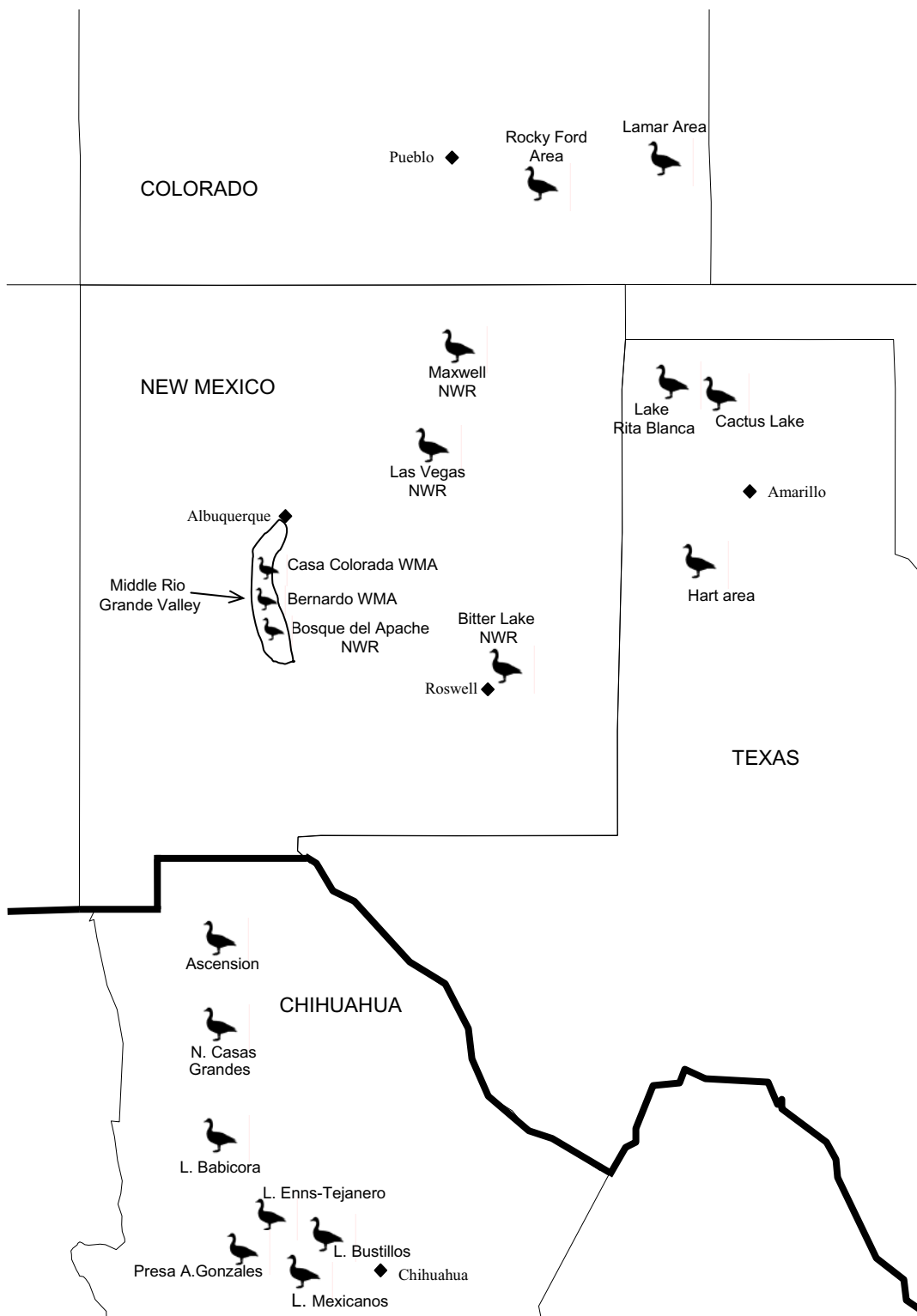


Fig. 1. Locations surveyed in the Western Central Flyway to assess species composition and productivity of lesser snow and Ross's geese, fall and winter, 2004-2005.

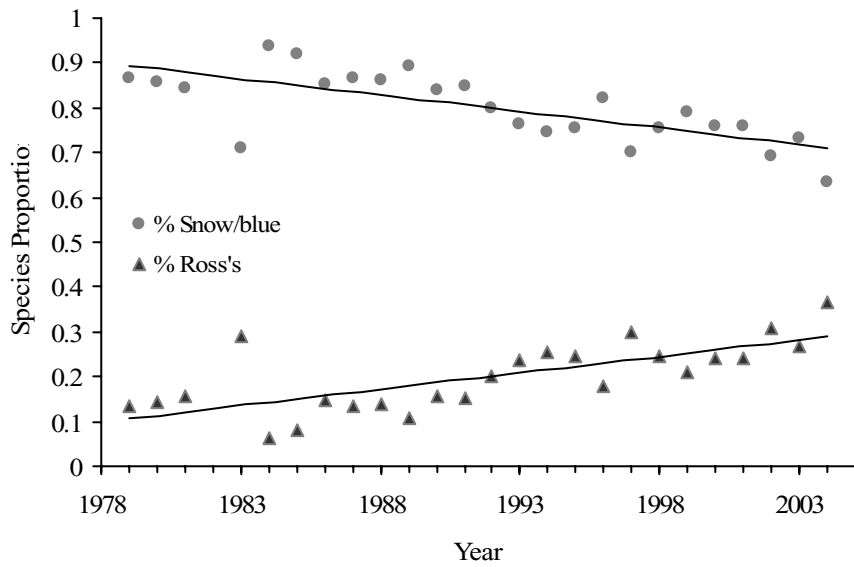


Fig. 2. Proportion of adult snow and Ross's geese in the Western Central Flyway Population, Winters 1979 – 2004. Data for 1982 were unavailable.

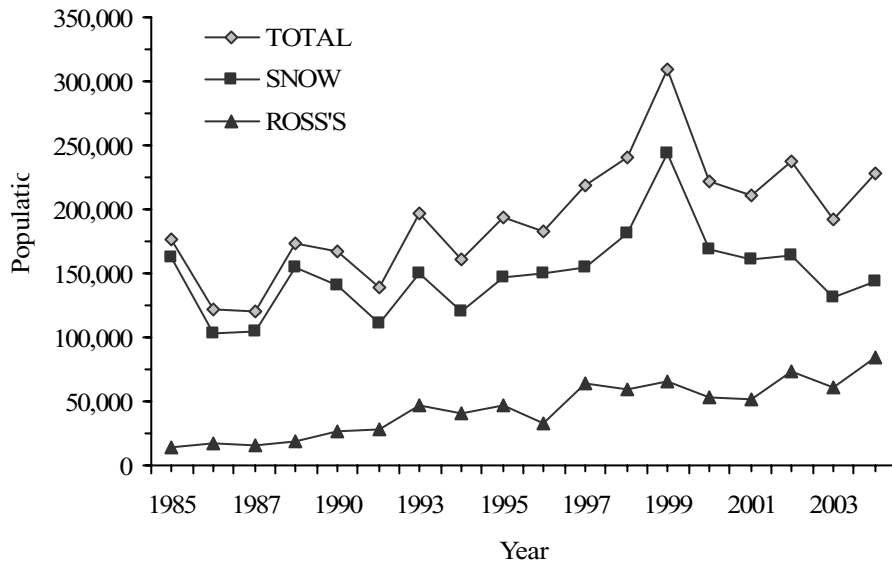


Fig. 3. Population estimates of Western Central Flyway light geese during winters 1985 – 2004. Incomplete survey years, 1988 and 1991, were excluded. Population estimates for each species were calculated using species compositions weighted for the Flyway based on each year (see Table 2).

SNOW AND ROSS'S GEESE SURVEYS IN THE MIDDLE RIO GRANDE VALLEY, NEW MEXICO, AND IN CHIHUAHUA, MEXICO, WINTER 2004-05

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ABSTRACT: Flocks of lesser snow geese and Ross's geese (light geese) were surveyed in the Middle Rio Grande Valley, New Mexico and at 7 areas in Chihuahua, Mexico during winter 2004-05. In New Mexico, geese peaked at 39,150 on 6 January, -14.7% below the 20-year mean. In Chihuahua, 75,100 geese were recorded at 7 areas during 12-24 January and numbers were -4.1% below the mean. An estimated $\approx 112,475$ light geese were at survey sites in the Rio Grande Valley, New Mexico and at 7 areas in Chihuahua in mid January 2005. Samples of geese (New Mexico-10,892, Chihuahua-9,894) were classified by species, color morph and age. Species composition of adults in New Mexico was 63.1% snow geese and 36.9% Ross's geese; 1.88% of adult snow geese were blue morph. In Chihuahua, 66.8% of adults were snow geese and 33.2% were Ross's geese; 1.49% of adult snow geese were blue morph. The percentages of immature snow geese were 12.9% in New Mexico and 12.6% in Chihuahua, and were -36.0% and -37.5% below the 20-year means, respectively. The mean number of immatures per family was 1.65 in New Mexico and 1.92 in Chihuahua. Ross's geese averaged 10.5% and 10.2% immatures in New Mexico and Chihuahua, respectively. Recruitment in New Mexico and Chihuahua was -27.6% and -42.0% below average, respectively. Four blue morph Ross's geese were recorded during surveys.

Snow and Ross's geese wintering in New Mexico and the Northern Highlands of Mexico, including the state of Chihuahua, belong to the Western Central Flyway Light Goose Population (Central Flyway Council 1982). Most originate from nesting colonies in the western and central Canadian Arctic with smaller numbers from Alaska and west Hudson Bay colonies. Rare individuals from Wrangel Island, Russia and eastern Arctic colonies on Baffin and Southampton Islands, La Perouse Bay and Cape Henrietta Maria also have been recorded. The senior author has monitored wintering light geese flocks for various population parameters in the Middle Rio Grande Valley, New Mexico annually since 1978 and at 5-7 locations in Chihuahua, Mexico since 1984.

Locations surveyed in the Rio Grande Valley included the Edeal Dairy at Los Lunas and the Bosque del Apache NWR (Bosque Refuge); light geese were not at State Waterfowl Management Areas during our survey. These winter sites were described by Taylor and Kirby (1990). In Chihuahua, 7 wetland units were surveyed. Laguna Encinillas has not been surveyed since 1996 and starting in 1997 we substituted a new unit, Lagunas Tejanero and Tascate (Drewien and Shea 1998). These 2 small wetlands and the nearby small Laguna Enns, located in 1998, are in the Cuauhtemoc Valley in west-central Chihuahua and northwest of Laguna Bustillos in the Mennonite farm country. Various areas surveyed in Chihuahua were described by Saunders and Saunders (1981), Drewien and Brown (1985, 1987, 1993), Turner et al. (1994) Drewien et al. (1996, 2003), and Drewien and Shea (1998).

Information collected from flocks at each location included estimates of total numbers, species composition, color morph (white:blue), adult:immature composition, and family size for snow geese; neckband sightings were also recorded. Proportions of snow:Ross's geese and % blue morphs were calculated from samples of adults only. Flock survey methods have been described elsewhere (e.g., Drewien and Brown 1985, 1993, Drewien et al. 2003) and include recording spot samples of 50-150 geese at intervals along a continuous "W" pattern to insure sampling along edges and within interior of flocks.. This is important for sampling Ross's geese as they usually concentrate in the interior of mixed light geese flocks. We surveyed geese in the Rio Grande Valley on 15-17 December 2004 and in Chihuahua between 12-24 January 2005.

Surveys were funded by the U.S. Fish and Wildlife Service, Division of Migratory Bird Management. We thank Philip Thorpe and James Voelzer for providing funds for the survey. Bernard Lujan and Colin Lee, Bosque Refuge, kindly provided goose count data and other information for the Middle Rio Grande Valley; and Michael Schwitters assisted with collar reading in Chihuahua.

RESULTS AND DISCUSSION

Habitat and Survey Conditions

Habitat conditions were improved in the Middle Rio Grande Valley compared to recent winters dominated by drought. Corn production at the Bosque Refuge and the New Mexico Game and Fish Wildlife Management Areas were above average providing adequate winter food (Bernard. D. Lujan, pers. comm.). For the third winter, mortality in light geese from avian cholera was not recorded.

In Chihuahua, drought continued and wetland water levels were very low into late November. However, abnormally high precipitation in December provided much needed water and filled small depressional wetlands and provided several inches of water in the basins of larger wetlands that had been dry or nearly dry (e.g., L. Mexicanos, L. Babicora). In the Madera Valley, the small Penitas Reservoir was dry in November but running over the spillway by 12 January. In the Cuauhtemoc Valley we noted some unharvested corn fields were partially flooded from the recent heavy rains. Conditions at the tri-wetland complex of Tejanero-Tascate-Enns varied. Laguna Tascate was dry, whereas Laguna Enns, a small (<100 ha) but deeper wetland, had moderate water levels. Laguna Tejanero, although reported dry for most of the fall, was covered with up to 6-inches of water from the rains. Water levels were extremely low at Laguna Bustillos and A. Gonzales Reservoir where vast areas of exposed mud flats were present. Laguna de los Mexicanos was surrounded by extensive mudflats with shallow water confined to the center (geese were walking in the center of the wetland). Laguna Babicora, often the most important light goose winter area in the Interior Highlands, had very low water levels with only some 20% of the wetland basins containing shallow water and they were surrounded by extensive mud flats. We were unable to approach geese within sufficient distances to classify them by species and age at larger wetlands surrounded by vast mud flats. We found no geese in the Madera Valley west of L. Babicora although thousands of sandhill cranes were present; water levels at L. Golondrinas were low. The largest goose concentrations we found were at N. Casas Grandes and Laguna Bustillos.

Northern pintail was the most abundant duck species observed during the survey with largest concentrations noted at L. Enns (9,500) and L. Tejanero (18,500). These same lagunas held the largest concentrations of long-billed curlews and we estimated 1,900 at L. Tejanero and 450 at L. Enns.

Small grain stubble fields, mainly oats and sorghum, and harvested corn fields were present at most survey locations in Chihuahua, and provided food for geese. Irrigated fields of alfalfa, winter wheat, milo and corn were utilized extensively by light geese at N. Casas Grandes. Agricultural lands surrounding Lagunas Tejaneros, Enns, and Bustillos in the Cuauhtemoc Valley included thousands of irrigated acres of harvested corn, oats and some barley but most fields had been plowed by mid January. Harvested dry land oat fields were the primary foraging sites for geese around A. Gonzales Reservoir.

Several days with high winds negatively impacted surveys and rain limited access to some wetlands due to muddy fields and roads at A. Gonzales Reservoir, L. Babicora, and in the Cuauhtemoc Valley. We encountered more goose hunters than we have observed in many years during our survey. Goose hunting negatively impacted some surveys in the Cuauhtemoc Valley and nearby A. Gonzales Reservoir as geese were extremely wary and readily flushed when approached. During a morning survey near the reservoir, geese failed to land and feed after flying over and circling fields for >1.5 hours but then left the area towards Laguna de los Mexicanos. In an

afternoon survey, a flock of some 4,000 finally landed but as we approached them they were flushed by 2 hunters with .22 rifles; we were unable to classify any geese associated with the reservoir.

An outfitter, operating out of L. Mexicanos, was using blinds and decoys. To improve shooting opportunities at the blinds, two individuals in separate vehicles flushed feeding goose flocks in areas near blinds in hopes that the geese would find the decoys. This hunting strategy made geese extremely difficult to approach closely to classify them. The outfitter informed us that he had a booking agent in Italy and several of the hunting parties during January were from Italy, Estonia, and Lithuania.

We found that many hazed geese left Laguna de los Mexicanos and moved to other wetlands 15-30 miles north in the Cuauhtemoc Valley; a neck-collared goose confirmed these movements.. On 13 January we estimated >12,000 light geese left the wetland but only 7,000 returned during mid-day hours after field feeding. A week later the outfitter moved his hunting activities northward in the Valley because so few geese remained at Laguna de los Mexicanos.

We received two separate reports, one from the outfitter and one from a Mennonite farmer, that ducks had been poisoned by Mennonite farmers mainly during April-May because they were feeding in large numbers in newly planted corn fields (and possibly other crops). We were told that the pesticide Furadan was mixed with corn and scattered in fields subject to depredations and that the large numbers of ducks were killed. We suspect most of the ducks being poisoned are resident Mexican ducks as migratory ducks that field feed should have left the region by April.. The reports were confined to the Mennonite farming area in the Cuauhtemoc Valley.

Lesser Snow Goose and Ross' Goose Populations

New Mexico: A peak winter population of 39,150 light geese was recorded in the Middle Rio Grande Valley on 6 January (Tables 1 and 2). The peak population estimate was -14.7% below the 20-year mean (45,922). A population of 31,350 was present in the Rio Grande Valley during the mid December survey and 37,375 during our survey in Chihuahua (Table 2).

A total of 10,892 light geese was classified by species and age (Table 2). Classification of 9,582 adults yielded 63.1% snow geese and 36.9% Ross's geese (Table 2). The proportion of Ross's geese in 2004 is +100.5% above the 18-year mean ($x=18.4\%$). Of 6,043 adult snow geese classified, 1.88% ($n=114$) were blue morph (Table 2). During 20 winters, the percent blue morph averaged 1.8%, ($sd=0.19$) and has remained relatively constant (range, 1.5-2.1%). One blue morph Ross's goose was observed at Bosque NWR.

Chihuahua: A total of 75,100 light geese was recorded at 7 survey units or -4.1% below the 20-year mean (78,349) (Tables 1 and 2). We classified 9,894 light geese by species and age. Classification of 8,723 adults revealed that 66.8% were snow geese and 33.2% were Ross's geese (Table 2). The percentage of Ross's geese in light goose flocks varied by location from 4.2% at Laguna Enns to 59.4% at Laguna Bustillos (Table 2). An estimated 24,900 Ross's geese (weighted by flock size) were at 5 survey units. Three blue morph Ross's geese were recorded at N. Casas Grandes (2) and Ascension (1).

Classification of 5,831 adult snow geese showed that 1.49% ($n=87$) were blue morph (Table 2). The percentage of blue morph in Chihuahua averaged 0.60% ($sd=0.11$) between 1984-96 and had remained relatively constant over 13 years (range, 0.43-0.82) but increased to 1.13 during 1997-1998 winters and 1.33% during winters 1999-2000; the blue morph appears to be slowly increasing. Presence of the blue morph in 2004 varied by location with a low of 1.07% at Laguna Enns to a high of 2.01% at Laguna de los Mexicanos (Table 2).

Greater White-fronted Geese and Canada Geese

Some 1,500 white-fronted geese were observed in the Cuauhtemoc Valley but none were observed elsewhere during our survey. No Canada geese were observed during the survey.

Recruitment Estimates

Snow Geese: Samples totaling 6,938 snow geese (includes blue morph) in New Mexico contained 12.9% immatures (Table 2) and was -36.0% below the 20-year mean (20.2%). The percent immatures for the small sample of blue morphs (n=130) was 12.3%. The mean number of immatures/family was 1.65 (Table 3). In Chihuahua, samples totaling 6,672 snow geese (includes blue morph) contained 12.6% immatures (Table 2) or -37.5% below the 20-year mean (20.1%). The percent immatures in a small sample of blue morphs (n=97) was 10.3%. The mean number of immatures/family was 1.92 (Table 3).

Ross's Geese: The percent immatures in a sample of 3,954 Ross's geese in New Mexico was 10.5% (Table 2), or -27.6% below the 18-year (1986-03) mean (14.5%). In Chihuahua, immatures averaged 10.2% in Ross's geese sampled at 5 units and varied by location from 7.8% at Laguna de los Mexicanos to 14.6% at Laguna Enns (Table 2). The 10.2% immatures was -42.0% below the 18-year mean (17.6%). Most immatures were not associated in family units during winter and data on family size were not collected (Drewien and Brown 1987).

Observations of Neckbanded Lesser Snow Geese and Ross's Geese

We observed 180 neckbanded geese (86-Ross's, 94-snow) including 114 in Chihuahua and 66 in New Mexico (Table 4). Neckbanded snow geese were mainly from western and central Arctic colonies, except for 3 from (2-red and 1-green) eastern Arctic colonies on Baffin Island (1), Southampton Island (1), and LaPerouse Bay (1) (K. Meeres, CWS, pers. comm.). Most neckbanded Ross's geese were from the central Canadian Arctic (blue) and smaller numbers were from west Hudson Bay (yellow).

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Table 1. Counts of lesser snow geese and Ross's geese in the Middle Rio Grande Valley, New Mexico, and at 5-7 sites in Chihuahua, Mexico, winters 1984-2004.

Year	Rio Grande		Chihuahua	Areas surveyed in Mexico	Comments
	Valley, NMI ^{1/}	Mexico			
1984	41,375	25,800		6	Partial counts-Ascension & Babicora; NS 2/ A. Gonzales Reservoir
1985	62,399	90,900		7	
1986	36,902	56,129		7	
1987	39,400	56,175		7	
1988	42,367	73,900		5	NS-Bustillos, Mexicanos
1989	47,800	96,718		7	
1990	55,275	74,550		7	
1991	38,920	30,205		6	Partial count-Ascension, NS-Babicora
1992	31,000	88,562		7	
1993	46,200	105,700		6	NS-Encinillas
1994	47,950	81,140		6	Severe drought; NS-Encinillas, Partial count-Ascension
1995	45,082	57,715		7	Extreme drought-Babicora & Mexicanos dry
1996	49,200	87,100		7	Water levels low
1997	39,960	105,700		7	Water levels below normal, NS- Encinillas 3/
1998	50,650	91,050		7	Extreme drought-Ascension, Babicora, Mexicanos dry
1999	56,400	86,600-102,050		7	Partial count-Mexicanos
2000	55,600	78,905		7	Water levels very low, several wetlands dry
2001	59,050	85,930		7	Extreme drought, several wetlands dry
2002	38,000	133,975		7	Drought, water levels very low, Babicora dry
2003	34,900	60,225		7	Extreme drought-Ascension, Babicora, Mexicanos dry
2004	39,150	75,100		7	Water levels low but improved water levels in Dec due to heavy precipitation

^{1/} Peak counts; data provided by J. Taylor, C. Lee and B. Lujan, Bosque del Apache NWR (pers. comm.);

^{2/} NS = No Survey

^{3/} Lagunas de Tejanero-Tascate-Enns substituted for L. Encinillas starting 1997-99.

Table 2. Population estimates and numbers of lesser snow geese and Ross's geese sampled in the Middle Rio Grande Valley, New Mexico, and in Chihuahua, Mexico, winter 2004-05.

Location	Pop.		Snow/Blue geese		Ross' geese		Total	Total geese
	Est.		Immature <u>1/</u>	(%)	Adult	Immature (%)		
	Adult	snow/blue	Immature <u>1/</u>	snow/blue	Adult	Immature (%)	Total	Total geese
NEW MEXICO								
Rio Grande Valley	5,929/114		879/ 16	(12.9)	6,938	415 (10.5)	3,954	10,892
		39,150 <u>2/</u> (37,375) <u>3/</u>						
CHIHUAHUA								
Ascension	696/13		90/ 3	(11.6)	802	57 (12.1)	473	1,275
N. Casas Grandes	1,712/29		237/ 2	(12.1)	1,980	143 (10.1)	1,421	3,401
L. Babicora	505/10		89/ 1	(14.9)	605	10 (11.4)	88	693
L. Tejanero	1,853/20		249/ 3	(11.9)	2,125	14 (14.6)	96	2,221
L. Enns	637/ 8		97/ 1	(13.2)	743	98 (9.4)	1,043	1,786
L. Bustillos	341/ 7		69/ 0	(16.5)	417	8 (7.9)	101	518
L. Mexicanos								
A. Gonzales Res.								
TOTAL (\bar{X} %)	5,744/ 87	75,100	831/10	(12.6)	6,672	330 (10.2)	3,222	9,894

1/ % immatures include blue morph.

2/ Peak count in Valley, 6 Jan 2005, (B. Lujan, pers. comm.).

3/ Estimated number of light geese in Rio Grande Valley, New Mexico in Jan 2005 during Mexico survey.

Table 3. Family sizes of lesser snow geese in the Middle Rio Grande Valley, New Mexico, and in Chihuahua, Mexico, winter 2004-05.

Location	Immatures/family						Total immatures	Total families	Mean immatures per family
	1	2	3	4	5	6			
NEW MEXICO									
Rio Grande Valley	94	67	17	6			303	184	1.65
CHIHUAHUA									
Ascension	27	24	7	1			100	59	1.69
N. Casas Grandes	40	47	12	3			182	102	1.78
L. Babicora									
L. Tejanero	19	23	12	5	2		131	61	2.15
L. Emms	27	31	19	5	1		171	83	2.06
L. Bustillos	33	47	21	6			214	107	2.00
L. Mexicanos	17	16	4	1			65	38	1.71
A. Gonzales Res.									
Total Families -MX (immatures)	163	188	75	21	3		(863)	450	1.92

Table 4. Locations and numbers of neckbanded lesser snow geese and Ross's geese observed in the Middle Rio Grande Valley, New Mexico and Chihuahua, Mexico, winter 2004-05.

Location	Snow Geese					Ross Geese					Total
	Yellow	Black	Red	Green	Blue	Subtotal	Blue	Yellow	White	Subtotal	
NEW MEXICO											
Bosque NWR	24	10				34	13	6		19	53
Los Lunas							8	4	1	13	13
Subtotal	24	10				34	21	10	1	32	66
CHIHUAHUA											
Ascension	17	5				22	12	9	1	22	44
N. Casas Grandes	3	1				4	13	4	1	18	22
L. Babicora											
L. Tejanero	3	3				6					6
L. Enns	9	10	2	1		22		2		2	24
L. Bustillos	4				1	5	5	5	2	12	17
L. Mexicanos	1					1					1
A. Gonzales Res											
Subtotal	32	24	2	1	1	60	30	20	4	54	114
TOTAL	56	34	2	1	1	94	51	30	5	86	180

TITLE:

Pacific Flyway Goose and Swan Productivity Surveys - 2004

SPECIES SURVEYED:

Lesser Snow Goose (Chen caerulescens)

Ross's Goose (Chen rossii)

Greater White-fronted Goose (Anser albifrons albifrons)

Tule Greater White-fronted Goose (Anser albifrons gambelli)

Tundra Swan (Cygnus columbianus)

COOPERATORS:

Canadian Wildlife Service(CWS)

U.S. Fish and Wildlife Service(USFWS)

Division of Migratory Bird Management(DMBM)

Klamath Basin NWR

Red Rock Lakes NWR

Sacramento NWR

Delevan NWR

Colusa NWR

Sutter NWR

Butte Sink (CA/Pvt./FWS)

Oregon Department of Fish & Wildlife(ODFW)

Utah State Division of Wildlife Resources

Wrangel Island Preserve

REPORTED BY:

Elizabeth Huggins, Flyway Biologist, USFWS/Division of Migratory Bird Management

ABSTRACT:

Productivity surveys for most species and populations were conducted in 2004 and appear in the tables of this report along with a short narrative in the Results section. Productivity survey results from the portion of the Ross's goose population that winters in the northern highlands of Mexico, appear in the Western Central Flyway Report.

METHODS:

Procedures followed in conducting these appraisals are found in Lynch and Singleton (1964) and (1969). Additional techniques include analyzing aerial photographs and ocular sightings from aircraft. For this report the terms juvenile, immature, and young all refer to birds hatched in 2004.

RESULTS:

Lesser Snow Goose:

Western Arctic: No report

Mixed flocks: Table 1.

J. Isola, Mike Carpenter and M. Wolder collected data at Sacramento and Colusa NWR for 7 days from November 9, 2004 to December 14, 2005 with a result of 25.7% juvenile lesser snow geese.

Marty St. Louis collected data in the Summer Lake wildlife area for 4 days from October 20 to November 3, 2004 with a result of 23.6% juvenile lesser snow geese.

Wrangel Island: Table 2.

V. Baranyuk collected data on Wrangel Island in 2004 with a result of 4.9% juvenile lesser snow geese. Total spring population (117.5 thousand) was 35.5% higher, the breeding population was 34.3% higher and the percentage of successful nests was 9.5% higher than their long term means.

There was no data submitted this year for the Fraser/Skagit deltas.

Ross' Goose: Table 3.

Productivity appraisals for Central Flyway wintering Ross's geese in the northern highlands of Mexico continue to be conducted by Dr. Rod Drewien and are reported in the Western Central Flyway White Goose Productivity Survey Report.

J. Isola and M. Carpenter collected data at Sacramento and Colusa NWR for 3 days from November 9-23, 2004. A sample of 2295 total birds revealed 13.2% juvenile Ross's geese(N=1991 adults and 304 juveniles).

Greater White-fronted Goose: Table 4.

J. Isola and M. Wolder collected data at Colusa and Sacramento NWR for 3 days from November 9-17, 2004 with a result of 32.8% juvenile Pacific greater white-fronted geese(n=1096 adults and 536 juveniles).

E. Huggins collected data at the Klamath Basin NWR complex for 8 days from September 9 to October 7, 2004 with a result of 23.4% juvenile greater white-fronted geese (N=164 juveniles and 536 adults).

Tule Greater White-fronted Goose: Table 5.

M. Wolder , J. Isola and Sacramento NWR staff collected data at Sacramento, Delevan and Colusa NWR for 6 days from September 30 to November 18, 2004 with a result of 33.1% juvenile Tule greater white-fronted geese(n= 606 adult and 300 juvenile geese).

Marty St. Louis collected data in the Summer Lake wildlife area for 5 observation periods from September to October 2004 with a result of 23.5% juvenile Tule greater white-fronted geese.

Tundra Swan: Table 6 & 7.

Tom Aldrich reports on data collected in Utah with a result of 31.7% juvenile Tundra Swans (n= 13,128 adults and 6,101 juveniles) with 2.87 young/family. (Table 6&7)

Marty St. Louis collected data in the Summer Lake Wildlife Area for 7 days from October 25 to November 17, 2004 with a result of 18.41% juvenile Tundra Swans(1.94 young/family)(Table 6).

Rod King conducted surveys in the Sacramento Valley during December 7-10, 2004. He found Tundra Swan productivity rates of 19.5% juveniles +/- .15% S.E. at $P=.05(N=13,733$ total birds consisting of 11,061 adults and 2,672 juveniles)(Table 8). Productivity rate was not significantly different than the 20.05% juveniles in 2003. Total sample size (n=13,733) was 26% larger in 2004 than in 2003 (n= 10,858). A total of 1,233 broods consisting of 2,672 juveniles were observed this year for an average family size of 2.17 +/- 0.98 and was not significantly different than the 2.23 family size average for 2003. Total family sample size in 2004 (1,233) was also 26% larger than the sample in 2003(977),(Table 6).

Trumpeter Swan (Rocky Mountain Population): Table 8.

Data are provided from the annual fall survey and report, Trumpeter Swan Survey of the Rocky Mountain Population (RMP), Fall 2004. This report was formerly the Tristate Trumpeter Swan Survey Report (1967-1991) and is written and distributed by personnel from Red Rock Lakes NWR. The following is an excerpt from the 1993 report:

The current survey includes traditional Trumpeter Swan habitat in Montana (Centennial Valley, Madison River, upper Yellowstone River and surrounding area), Idaho (and area north of the south Fork of the Snake River and east of Camas NWR) Wyoming (Yellowstone National Park, Grand Teton National Park, National Elk Refuge, the South Fork of the Snake River and surrounding areas),

the East Rocky Mountain Front in Montana, Gray's Lake NWR and lower Snake River in Idaho, Ruby Lake NWR in Nevada, Malheur NWR and Summer Lake WA in Oregon, and the Salt and Green Rivers in Wyoming.

The primary purposes of the survey are to document the size of the resident trumpeter swan flocks and to enumerate the annual production of cygnets to fledgling age. The survey also provides some information on territorial occupancy and the distributions of failed breeders and non-breeders from year to year.

This years report was compiled by Jim Dubovsky Assistant Migratory Bird Coordinator. Observers from the Fall 2004 RMP survey counted 417 total swans in the U.S. Breeding segment of this population, a count identical to that for comparable areas last year. Numbers of white birds (318) and cygnets (99) were essentially the same as those from 2003 (321 and 96, respectively).

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Table 2. WRANGEL ISLAND SNOW GOOSE POPULATION / PRODUCTIVITY DATA (FROM V. BARANYUK)

YEAR	TOTAL SPRING POP.	ADULTS SPRING	%JUV SPRING	BREED POP	COLONY SIZE (HA)	NESTS	%SUCC. NESTS	CLUTCH SIZE	BROOD SIZE LV COLONY	BROOD SIZE LV ISLAND
1966								3.6		
1967								4.9		
1969				114.0	1962	58.2		3.7		
1970	150.0	120.0	20.0	120.0	2600	60.0	96.0	3.7	3.5	2.5
1971	132.0	120.0	9.1	24.0	825	12.0	55.0	4.7	3.4	2.3
1972	107.0	106.0	0.6	36.0	950	18.0	45.0	4.2	3.5	2.3
1973	86.0	85.9	0.0	12.0	200	6.0	67.0	6.0	3.9	
1974	70.0	69.5	0.7	32.0	800	15.0	0.0	4.7		
1975	56.0	56.0	0.0	56.0		28.0	74.4	3.8	3.4	2.4
1976	58.0	46.0	20.7	46.0	1840	23.0	79.0	3.7	3.2	2.8
1977	68.2	57.2	16.1	10.0	400	5.0	76.8	5.0	3.7	
1978	65.4	64.9	0.8	42.0	2200	21.0	80.0	4.2	3.7	2.4
1979	84.5	62.1	26.5	60.0	1860	30.0	90.0	3.8	3.6	
1980	90.7	80.3	11.5	20.0	315	10.0	70.0	5.4	3.3	
1981	89.0	86.2	3.2	78.0	2118	39.0	95.0	4.0	3.7	3.1
1982	100.0	81.0	18.5	28.0	688	14.0	65.0	4.1	3.2	2.8
1983	95.0	92.8	2.4	3.4	125	1.7	5.9	4.8		
1984	85.0	85.0	0.0	42.0	1500	21.0	83.3	3.7	3.2	2.1
1985	85.0	80.0	5.4	50.0	1457	25.0	87.7	3.7	3.2	2.4
1986	90.0	70.0	20.4	58.0	2100	29.0	90.0	3.9	3.6	3.2
1987	100.0	85.0	15.0	47.0	1900	23.5	80.0	3.7	3.4	2.8
1988	80.0	80.0	17.7	13.0	675	6.5	51.0	5.2	3.4	2.7
1989	70.0	70.0	1.4	60.0	1025	30.0	60.0	3.8	3.3	
1990	60.0	60.0	0.0	53.0	940	26.5	49.2	3.8	3.2	2.2
1991	60.0	56.0	6.6	41.6	888	20.8	82.0	4.1	3.4	2.7
1992	70.0	56.0	20.0	46.2	742	23.1	70.1	4.0	3.5	3.5
1993	65.0	64.5	0.8	52.2	910	26.1	85.1	3.9	3.2	
1994	70.0	52.5	25.0	30.0	1000	15.0	13.0	2.8	2.1	
1995	65.0	64.0	0.8	8.8	430	4.4	50.0	4.7	2.8	
1996	75.0	75.0	0.0	75.4	740	37.7	75.4		3.7	2.4
1997	85.0	70.0	15.0	55.2	628	22.6	71.2	4.0	3.5	
1998	90.0	80.0	10.0	31.8	750	15.9	66.0	4.6	3.5	
1999	90.0	85.0	5.6	20.8	278	10.4	75.0	4.7	3.3	
2000	95.0	87.4	8.0	49.6	738	24.8	87.8	3.5	3.2	2.8
2001	105.0	92.4	12.0	48.0	900	24.0	87.0	3.6	3.2	2.3
2002	110.0	100.0	10.0	60.6	855	30.3	81.5	4.0	3.5	3.1
2003	115.0			55.0	900	27.5	77.5			2.2
2004	117.5	105.0	4.9	56.8		28.4	75.0	3.6		

Mean	86.7	77.8	9.1	42.3	1008.1	21.0	68.5	3.8	3.4	2.6
% change from 2003	2.2			3.3			-3.2			
%change from mean	35.5			34.3			9.5			

Table 3. Historical productivity records for Pacific wintering Ross's geese, 1965 to present.

Year	Miscellaneous Areas				Saskatchewan				Sacramento Valley, CA			
	Ad	Juv	%Juv.	Yg/Fam	Ad.	Juv.	%Juv.	Yg/Fam	Ad.	Juv.	%Juv.	Yg/Fam
1965			27.1									
1966			53.2	2.9								
1967			25.4	2.6								
1968			32.4	2.6								
1969												
1970												
1971												
1972			0.4									
1973			45.1	2.7								
1974			13.7	1.8								
1975			41.5	2.7								
1976												
1977			38.5	2.3								
1978			4.1	1.6								
1979												
1980			24.0									
1981												
1982												
1983			23.0									
1984			35.6									
1985			20.0									
1986												
1987												
1988												
1989												
1990												
1991												
1992												
1993												
1994							26.0					
1995					4941	2040	29.2					
1996					459	446	46.9					
1997					4976	1539	23.6	0.33				
1998									197	76	27.8	
1999												
2000												
2001									1023	179	14.9	
2002									6371	1202	15.9	
2003									4274	844	16.5	2.65
2004									1991	304	13.2	

Data on Ross' geese of the Western Central Flyway are included in the "Western Central Flyway Light Goose Productivity Surveys", section of this North American Productivity Report.

See individual Annual Winter Productivity Report narratives which credit participants with their respective data set for each area.

Table 4. Historical productivity records for Greater white-fronted geese in the Pacific Flyway 1961 to present.

Year	Misc.			Areas			Klamath Basin, OR & CA			Sacramento Valley, CA			Combined Productivity % Juv.	
	Population Indices* (thousands)	Ad.	Juv.	%Juv.	Yg/Fam	Ad.	Juv.	%Juv.**	Yg/Fam	Ad.	Juv.	%Juv.		Yg/Fam
1961	193.3	2407	1383	36.5	2.27									
1962	127.7	3587	2289	38.9	2.52									
1963	171.8	5653	2401	29.8	2.27									
1964	99.9	8270	3834	31.7	2.29									
1965	69.3					11461	7303	38.9	2.6					
1966	67.0	2847	2045	41.8	2.5									
1967	185.6	3716	1682	31.2	2.49									
1968	70.9	2663	1826	40.7	2.39									
1969	114.2	3071	1821	37.2	2.35									
1970	206.7	2734	1073	28.2	2.21									
1971	106.3	2171	1314	37.7	2.37									
1972		2028	1483	42.2	2.07									
1973				38.6	2.47									
1974				28.6	1.81									
1975				41.2	1.9									
1976				49.9	2.48									
1977				39	2.01									
1978				37.7	2.02									
1979	73.1			38.4	1.82									
1980	93.5					7380	2620	26.2	2.18					
1981	116.5					29480	10520	26.3	1.9					
1982	91.7					3770	460	10.9	2	1465	383	20.7	1.9	13.9
1983	112.9			19.7	2.9			29				29		
1984	100.2							20.5	3.24			28		
1985	93.8			15.5				13.5, 15.1	1.92			33		
1986	107.1							26.7, 35	1.8			28-32	2.3	
1987	130.6											37		
1988	161.5											33-35		
1989	218.8	3300	1700	34.0								25		
1990	240.8									98	60	38.6		
1991	236.5									1079	531	33		
1992	230.9									7290	2835	28		
1993	295.1					3239	1137	26		2947	1146	28		27.0
1994	324.8					1127	264	19	1.38	1350	588	30.3		25.6
1995	277.5					587	263	31		1706	927	35.2		34.2
1996	344.1					1153	260	18.4	3.54	1967	411	17.3		17.7
1997	319.0					757	371	32.9	2.13	2085	384	15.6		21.0
1998	413.1					410	78	16.0	1					16.0
1999	393.9					1569	323	17.1						17.1
2000	353.6					383	67	14.9		360	81	18.4		16.6
2001	433.4					1478	287	16.3		2981	834	21.9		20.1
2002	358.5					1090	315	22.4		3418	511	13		15.5
2003	422.2									1575	206	11.6		11.6
2004	374.9					536	164	23.4		1096	536	32.8		30.0

*Population indices from Pacific Flyway Data Book (Trost, et al). Indices after 1998 are based on number of total indicated birds from breeding ground survey and calculated according to guidelines established in the Flyway management plan.

**For %Juv. columns with more than one estimate of productivity, sample sizes were not available.

See individual Annual Winter Productivity Report narratives which credit participants with their respective data set for each area.

Table 5. Historical productivity records for Tule greater white-fronted geese, 1964 to present.

Year	Miscellaneous Areas		Summer Lake, OR		Klamath Basin, OR & CA		Sacramento Valley, CA			Combined Productivity % Juv.	
	Ad.	Juv.	%Juv.	Ad.	Juv.	%Juv.	Ad.	Juv.	%Juv.		Yg/Fam
1964							99	26	21.7	2	21.7
1965											
1966											
1967											
1968											
1969											
1970											
1971											
1972											
1973											
1974											
1975											
1976											
1977											
1978			35.4								
1979			28.9								
1980	1324	213	13.9				1653	847	33.8		26.3
1981	847	437	34				1449	851	37.0	1.85	35.9
1982	833	167	16.7							2.01	16.7
1983											
1984											
1985											
1986									18.0		18.0
1987									37.0		37.0
1988									28.0		28.0
1989									27.0		27.0
1990							863	234	21.4		21.4
1991							680	222	24.6		24.6
1992							546	128	19.0		19.0
1993							295	77	20.7		20.7
1994							182	94	34.0		34.8
1995							70	30	30.0		30.0
1996							529	136	20.5		27.8
1997							117	12	9.3		18.2
1998							69	11	13.7		17.6
1999							873	566	39.0		32.2
2000							619	152	19.7		21.6
2001							384	78	16.9		21.3
2002	441	126	22.2				664	139	17.3		20.2
2003							450	123	21.5		20.4
2004							606	300	33.1		29.2

See individual Annual Winter Productivity Report narratives which credit participants with their respective data set for each area.

Table 6. Historical productivity records for Tundra swans in the Pacific Flyway, 1961 - present.

Year	Population* Indices (thousands)	Miscellaneous Areas			Utah			Summer Lk., OR			Sacramento Valley, CA			Combined Productivity % Juv		
		Ad.	Juv.	%Juv. Yg/Fam	Ad.	Juv.	%Juv. Yg/Fam	Ad.	Juv.	%Juv. Yg/Fam	Ad.	Juv.	%Juv. Yg/Fam			
1961	40.8			8.0		2.3										
1962	32.4			10.6		2.3										
1963	46.4			14.4		2.1										
1964	40.5			13.9		1.9	1595	745	31.8	2.2						
1965	42.6			14.7		2.2	1165	903	43.7	2.6						
1966	34.8			8.5		2.2	5578	3466	38.3	2.3						
1967	48.9			25.0		2.5	5943	5697	48.9	2.9						
1968	35.6			21.3		2.6	12463	9288	42.7	2.8						
1969	74.9			34.3		2.7	20801	17445	45.6	3.2						
1970	31.0			19.5		2.4	29478	8088	21.5	2.4						
1971	98.9			20.6		2.3	6497	2587	28.5	2.3						
1972	82.8			15.3		2.1	5982	2160	26.5	2.2						
1973	33.9			34.9		2.6	5036	3654	42.0	2.3						
1974	69.8			18.0		2.3	10764	3066	22.2	2.3						
1975	54.9			19.6		2.5	2879	702	19.6	2.5						
1976	51.4			39.7		2.6	1947	811	29.4	2.6						
1977	47.3			23.8		2.4	3878	1214	23.8	2.4						
1978	45.6			8.2		2.3	5040	1685	25.1	2.3						
1979	53.5						9130	4654	33.8	2.6						
1980	65.2						9242	4710	33.8	2.3						
1981	83.6						14128	6552	31.7	2.1						
1982	91.3	250	87	25.8		2.5	4715	1905	28.8	2.2						
1983	67.3	252	119	32.1		2.5	14004	8602	38.1	2.9						
1984	61.9	237	41	14.7		2.3	1428	798	35.8	2.5					20.0	
1985	48.8	238	74	23.7		2.6	824	449	35.3	2.3					18.0	
1986	66.2	245	28	10.3		2.0	1144	977	46.1	2.4					13.0	
1987	52.8	223	68	23.4		2.3	538	399	42.6	2.6					25.0	
1988	59.2	624	131	17.4		2.2	1834	1318	41.8	2.4					27.0	
1989	78.7	8628	1438	14.3		2.2	1551	1048	40.3	2.4					22.0	
1990	40.1	5440	1236	22.2		2.8	4250	2610	38.0	2.6					11.0	
1991	47.6	821	283	25.6		2.7	2750	1770	39.2	2.6					19.1	
1992	63.7	797	268	25.2		2.7	3250	1396	28.4	2.3					89	12.7
1993	62.2	1410	414	22.7		2.6	2169	1079	33.2	2.5					616	33.8
1994	79.4	2116	470	18.2			3958	1979	33.3	2.4					1386	26.6
1995	52.9						7221	3955	35.4	2.3					13182	26.0
1996	98.1	492	42	7.9			8493	3559	29.5	1.9					4358	30.7
1997	122.5	570	119	17.3			110336	24968	18.5	2.4					3695	26.2
1998	70.0	1167	164	12.3			88631	14132	13.8	2.2						18.3
1999	119.8	1221	103	7.8			68594	11814	14.7	2.2						13.3
2000	89.6						48098	3695	7.1	1.9						14.4
2001	87.3						26996	2174	7.5	2.0						7.5
2002	58.7						45069	9942	18.1	2.1						8.1
2003	102.7						18517	6018	24.5	2.6						17.8
2004	83.0															22.3
																19.2

*Population indices are from Pacific Flyway Data Book (Troost, et al) and are conducted in January. See individual annual Winter Productivity Report narratives which credits participants with their respective data set for each area.

Table 7. Age ratios and family group size of tundra swan flocks in northern Utah.

YEAR	Grouped Birds			Family Associations			Combined Totals		
	ADULTS	JUVENILES	% YOUNG	FAMILIES	YOUNG	YOUNG/FAM	ADULTS	JUVENILES	% YOUNG
1963	1,397	527	27.4%	99	218	2.20	1,595	745	31.8%
1964	1,193	171	12.5%	372	717	1.93	1,937	888	31.4%
1965	883	541	38.0%	141	362	2.57	1,165	903	43.7%
1966	4,326	2,002	31.6%	626	1,464	2.33	5,578	3,466	38.3%
1967	4,753	3,975	45.5%	595	1,722	2.89	5,943	5,697	48.9%
1968	10,597	6,679	38.7%	933	2,609	2.80	12,463	9,288	42.7%
1969	19,527	15,414	44.1%	637	2,031	3.19	20,801	17,445	45.6%
1970	28,478	6,907	19.5%	500	1,181	2.36	29,478	8,088	21.5%
1971	5,465	1,422	20.6%	516	1,165	2.26	6,497	2,587	28.5%
1972	5,102	1,193	19.0%	440	967	2.20	5,982	2,160	26.5%
1973	3,696	2,105	36.3%	670	1,549	2.31	5,036	3,654	42.0%
1974	9,610	1,733	15.3%	577	1,333	2.31	10,764	3,066	22.2%
1975	2,443	163	6.3%	218	539	2.47	2,879	702	19.6%
1976	1,457	171	10.5%	245	640	2.61	1,947	811	29.4%
1977	2,960	123	4.0%	459	1,091	2.38	3,878	1,214	23.8%
1978	3,848	342	8.2%	596	1,343	2.25	5,040	1,685	25.1%
1979	7,210	2,198	23.4%	960	2,456	2.56	9,130	4,654	33.8%
1980	7,868	3,116	28.4%	687	1,594	2.32	9,242	4,710	33.8%
1981	11,636	3,917	25.2%	1,246	2,635	2.11	14,128	6,552	31.7%
1982	4,173	1,305	23.8%	271	600	2.21	4,715	1,905	28.8%
1983	12,456	6,373	33.8%	774	2,229	2.88	14,004	8,602	38.1%
1984	1,298	639	33.0%	65	159	2.45	1,428	798	35.8%
1985	670	276	29.2%	77	173	2.25	824	449	35.3%
1986	754	513	40.5%	195	464	2.38	1,144	977	46.1%
1987	402	224	35.8%	68	175	2.57	538	399	42.6%
1988	1,364	762	35.8%	235	556	2.37	1,834	1,318	41.8%
1989	1,263	696	35.5%	144	352	2.44	1,551	1,048	40.3%
1990	3,548	1,708	32.5%	351	902	2.57	4,250	2,610	38.0%
1991	2,286	1,176	34.0%	232	594	2.56	2,750	1,770	39.2%
1992	3,102	920	22.9%	209	476	2.28	3,520	1,396	28.4%
1993	1,809	630	25.8%	180	449	2.49	2,169	1,079	33.2%
erial Photo	2,380	598	20.1%	143	381	2.66	2,666	979	26.9%
1994	3,434	1,346	28.2%	262	633	2.42	3,958	1,979	33.3%
1995	5,655	2,178	27.8%	783	1,777	2.27	7,221	3,955	35.4%
1996	7,317	2,434	25.0%	588	1,125	1.91	8,493	3,559	29.5%
1997	108,626	22,934	17.4%	855	2,034	2.38	110,336	24,968	18.5%
1998	87,629	13,033	12.9%	501	1,099	2.19	88,631	14,132	13.8%
1999	67,388	10,481	13.5%	603	1,333	2.21	68,594	11,814	14.7%
2000	47,752	3,371	6.6%	173	324	1.87	48,098	3,695	7.1%
2001	26,836	2,012	7.0%	80	162	2.03	26,996	2,174	7.5%
2002	43,301	8,115	15.8%	884	1,827	2.07	45,069	9,942	18.1%
2003	18,103	5,485	23.3%	207	533	2.57	18,517	6,018	24.5%
2004	13,052	5,992	31.5%	38	109	2.87	13,128	6,101	31.7%
2005									

Table only includes Oct-Jan classification

Table & data provided by Tom Aldrich

Table 8. Historical records for the Rocky Mountain Population of Trumpeter Swans, 1967 to Present.*

Year	Area	White birds	Cygnets	Total	% Juv.	Ave. Brood Size
1967	Tristate Survey	580	58	638	9.1	
1968	Tristate Survey	489	174	663	26.2	
1969						
1970						
1971	Tristate Survey	477	95	572	16.6	
1972						
1973						
1974	Tristate Survey	492	89	581	15.3	
1975						
1976						
1977	Tristate Survey	454	90	544	16.5	
1978						
1979						
1980	Tristate Survey	533	49	582	8.4	
1981						
1982						
1983	Tristate Survey	471	76	547	13.9	
1984	Tristate Survey	496	67	563	11.9	
1985	Tristate Survey	431	144	575	25.0	3.1
1986	Tristate Survey	365	87	452	19.2	2.7
1987	Tristate Survey	417	194	611	31.8	3.5
1988	Tristate Survey	513	146	659	22.2	2.9
1989	Tristate Survey	535	63	598	10.5	2.5
1990	Tristate Survey	468	158	626	25.2	3.0
1991	Tristate Survey	446	109	555	19.6	3.3
1992	RMP Survey**	465	98	563	17.4	3.5
1993	RMP Survey	303	51	354	14.4	2.2
1994	RMP Survey	302	152	454	33.5	2.2
1995	RMP Survey	365	62	427	14.5	
1996	RMP Survey	380	78	458	17.0	2.6
1997	RMP Survey	358	69	427	16.2	1.0
1998	RMP Survey	364	105	469	22.4	2.0
1999	RMP Survey	347	70	417	16.8	2.3
2000	RMP Survey	372	109	481	22.7	2.3
2001	RMP Survey	416	71	487	14.6	1.2
2002	RMP Survey	311	60	371	16.2	
2003	RMP Survey	321	96	417	23.0	
2004	RMP Survey	318	99	417	23.7	

*As reported by Red Rock Lakes National Wildlife Refuge.

** Name changed to Trumpeter Swan Survey of the Rocky Mountain Population (RMP)/U.S. Flocks Fall 1992.

Note: It is the opinion of the author of table (see narrative) that a better method to assess annual productivity is to estimate the number of young produced per breeding pair because a proportion of white birds each year are subadults or adults that did not nest. However, this data is not collected as a part of the Fall survey.

TITLE:

Waterfowl Productivity Surveys for Alaska – 2004

SPECIES SURVEYED:

Pacific Brant (*Branta bernicla nigricans*)
Trumpeter Swan (*Cygnus buccinator*)
Emperor Goose (*Chen canagica*)
Dusky Canada Goose (*Branta canadensis occidentalis*)

CONTRIBUTORS:

U.S. Fish and Wildlife Service (USFWS)
 Izembek National Wildlife Refuge
 Koyukuk/Nowitna National Wildlife Refuge Complex
 Migratory Bird Management Anchorage
 Migratory Bird Management Fairbanks
 Migratory Bird Management Juneau
U.S. Forest Service (USFS)
 Cordova Ranger District
 Yakutat Ranger District
U.S. Geological Survey (USGS)
 Alaska Science Center
U.S. Army
 Fort Wainwright
Alaska Department of Fish and Game
 Division of Wildlife Conservation, Statewide Waterfowl Program
Paul Meyers – Alaska
Comox Valley Naturalists Society – British Columbia
Graeme Fowler – British Columbia
Russ Canniff – Washington

REPORT COMPILED BY:

Deborah J. Groves – Wildlife Biologist, Migratory Bird Management, Juneau, AK

ABSTRACT:

Productivity surveys were conducted by several agencies and individuals during late summer, fall, and/or winter of 2004 and early 2005 to estimate juvenile-to-adult age ratios for Pacific brant (*Branta bernicla nigricans*), the Pacific Coast population of trumpeter swans (*Cygnus buccinator*), emperor geese (*Chen canagica*), and dusky Canada geese (*Branta canadensis occidentalis*). The results of these surveys appear in the tables of this report, along with short narratives in the Results section. No age-ratio data were reported for cackling geese (*Branta hutchinsii*) in 2004.

The following productivity measures were estimated for 2004:

Species	Type of Year	Productivity Estimate	% Change From 2003	% Change From Mean
Pacific Brant	Below Average			
Fall % Juv.		18.2%	+33%	-19%
Fall Juv./Fam.		2.50	+11%	-5%
Winter % Juv.		11.6%	+78%	-5%
Trumpeter Swan	Below Average			
Late Summer Brood Size		3.0	+0%	-9%
Late Summer % Juv.		21.0%	-25%	-18%
Late Summer % Prs. w/ Brd		30.8%	-18%	-4%
Winter % Juv.		17.0%	-8%	-9%
Winter Juv./Fam.		2.50	+14%	+9%
Emperor Goose	Below Average			
Fall % Juv.				
From ground counts		21.9%	+83%	-6%
From aerial photos		11.1%	+19%	-41%
Fall Juv./Fam.		2.42	+20%	-14%
Cackling Goose	No Report			
Dusky Canada Goose	Above Average			
Late Summer % Juv.		27.8%	+286%	+47%

METHODS:

Fall and winter productivity appraisals generally followed procedures developed by Lynch (1969) and outlined in the Standard Operating Procedures for Productivity Surveys of Geese, Swans and Brant (Draft) 1977. Additional survey methods included late-summer aerial surveys of trumpeter swans (King 1973) and dusky Canada geese (Petrula 2004), analysis of aerial photographs of emperor geese (Anderson et al. 2005), and ocular sightings from the ground (e.g. Audubon Christmas Bird Counts).

RESULTS:

Pacific Brant:

Fall Productivity: Table 1.

Kristine Sowl of Izembek National Wildlife Refuge (NWR) reported that 18.2% juveniles were estimated from a sample of 24,099 brant during ground surveys conducted at Izembek Lagoon, Alaska in September and October. She also estimated a mean of 2.50 juveniles per family group from a sample of 129 families. The proportion of juveniles was 33% higher than 2003 but 19% below the 41-year mean. The mean family group size was 11% higher than 2003 but 5% below the 38-year mean.

Winter Productivity: Table 2.

Russ Canniff collected data from Padilla and Samish Bays, WA on 4 January 2005. He estimated 11.6% juveniles from a sample of 732 brant. He also reported a mean of 2.0 juveniles per family group from a sample of 13 families. He noted that all of the brant he observed in the area were the gray-bellied variety from the western high arctic population.

Results from Padilla and Samish Bays, WA were the only winter productivity data available for the report this year. These results, compared to historical winter productivity records for the Pacific Flyway, indicated that the proportion of juveniles was 78% higher than 2003 but 5% below the 20-year mean.

In summary, Pacific brant experienced below-average production in 2004.

Trumpeter Swan:

Late-Summer Productivity: Tables 3 and 4.

Late-summer productivity surveys were conducted in Alaska between 5 August and 7 September by Koyukuk/Nowitna NWR, U.S. Army at Fort Wainwright, and USFWS Migratory Bird Management Juneau. All surveys were flown using methods described by King (1973), with modifications to allow capture of observation locations directly from the aircraft's global positioning system. Thirty eight complete and one partial 1:63,360 scale topographic maps were surveyed this year. Combining the results from all areas yielded a mean brood size of 3.0 (n=177 broods), 21.0% juveniles in the population (n=2,525 total swans), and 30.8% pairs with brood (n=543 pairs) (Table 3). The mean brood size was the same as 2003 and was 9% below

the 28-year mean (Table 4). The proportion of juveniles was 25% lower than 2003 and 18% below the mean. The percentage of pairs with a brood was 18% lower than 2003 and 4% below the mean.

Winter Productivity: Table 5.

Winter productivity data were collected in two areas of Alaska this year: Cordova and the Yakutat Forelands. Paul Meyers reported that 21.7% juveniles were observed out of a total of 23 swans during the Audubon Christmas Bird Count in Cordova on 19 December. On the Yakutat Forelands, Nate Catterson of USFS, Yakutat Ranger District, reported 13.9% juveniles out of 569 total swans observed during an aerial population survey flown on 10 March 2005.

On Vancouver Island, British Columbia, Graeme Fowler reported the results of swan surveys conducted from November 2004 through February 2005 by the Comox Valley Naturalists Society. The mean % juvenile was 20.0% (n = 918) in November, 17.5% (n = 1,978) in December, 16.6% (n = 1,745) in January, and 16.7% (n = 2,263) in February. Note that only the February figure was included in Table 5.

In northwest Washington, Russ Canniff recorded age ratios for trumpeter swans in Skagit Valley and Port Susan on 24 February 2005 and Snohomish Valley on 14 February 2005. He found that 17.6% were juveniles from a sample of 4,007 swans. He also collected data on family group size from November 2004 through February 2005 and found a mean of 2.50 juveniles per family group from a sample of 106 families.

Data from all winter survey areas combined resulted in an estimate of 17.0% juveniles from a sample of 6,862 swans. This was 8% lower than 2003 and 9% below the 27-year mean. The mean family group size was 2.50 from a sample of 106 families. This was 14% higher than 2003 and 9% above the 22-year mean.

In summary, trumpeter swans experienced below-average production in 2004.

Emperor Goose: Tables 6 and 7.

Kristine Sowl reported that 21.9% juveniles were estimated from a sample of 5,888 emperor geese during ground surveys conducted at Izembek Lagoon, Alaska in September and October (Table 6). She also estimated a mean of 2.42 juveniles per family group from a sample of 235 families. The proportion of juveniles was 83% higher than 2003 but 6% below the 37-year mean. The mean family group size was 20% higher than 2003 but 14% below the mean.

Paul Anderson and Bob Stehn of USFWS, Migratory Bird Management Anchorage reported the results of aerial photo work on the Alaska Peninsula conducted in late September. They estimated the proportions of juveniles in seven major lagoons from aerial photos and then weighted the proportions by the population counts of those lagoons from an independent aerial population survey. The result was a weighted-mean estimate of 11.1% juveniles for the 2004 fall population, 19% higher than 2003 but 41% below the 19-year mean (Table 7).

In summary, emperor geese experienced below-average production in 2004.

Cackling Goose: No Report.

Dusky Canada Goose: Table 8.

Tom Rothe of the Alaska Department of Fish and Game reported the results of an aerial production survey that was flown over the west Copper River Delta on 16 July. Of a total count of 5,678 geese, 27.8% were identified as juveniles. The proportion of juveniles was 286% higher than 2003 and 47% above the 33-year mean.

Rothe and his colleagues also conducted a ground survey on Middleton Island in the Gulf of Alaska on 20-22 June (Petrula et. al 2004). The survey has been done periodically to determine the status of this island group of dusky Canada geese, which breeds in an environment free of mammalian predators and generally experiences higher productivity than its mainland counterparts. Of an estimated total 2370 geese, 37% were goslings. This compared to 34%, 40%, 48%, and 37% in 1996, 1997, 2000, and 2002, respectively.

In summary, dusky Canada geese experienced above-average production in 2004.

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Graeme Fowler – Comox, British Columbia

Russ Canniff – Snohomish, Washington

Table 1. Historical fall productivity records for Pacific brant at Izembek Lagoon, AK, 1963-2004.^a

Year	Grouped Birds			Family Associations		
	Adults	Juveniles	% Juv.	Families	Juveniles	Juv./Family
1963	3968	1243	23.9			
1964	13324	4577	25.6			
1965	21210	5050	19.2			
1966	9927	7134	41.8	195	557	2.86
1967	15219	3081	16.8	359	926	2.58
1968	15110	3117	17.1	145	377	2.60
1969	12829	3577	21.8	293	780	2.66
1970	12104	6256	34.1	148	476	3.22
1971	4820	1953	28.8	295	716	2.43
1972	6599	3698	35.9	153	416	2.72
1973	12025	4999	29.4	327	938	2.87
1974	13118	632	4.6	105	239	2.28
1975	9396	5452	36.7	189	543	2.87
1976	7962	4340	35.3	237	674	2.84
1977	8856	4092	31.6	240	603	2.51
1978	10696	1842	14.7	110	326	2.96
1979	13674	2349	14.7	146	361	2.47
1980	9618	3341	25.8	177	489	2.76
1981	4109	936	18.6	154	431	2.80
1982	11509	1213	9.5	89	237	2.66
1983	6149	1947	24.0	173	515	2.98
1984	9451	1499	13.7	192	564	2.94
1985	12032	1915	13.7	624	1538	2.46
1986	15621	2823	15.3	137	352	2.57
1987	17411	7882	31.2	948	2587	2.73
1988	16138	3847	19.2	263	633	2.41
1989	13654	4281	23.9	303	914	3.02
1990	24215	5750	19.2	349	894	2.56
1991	31432	12127	27.8	415	1066	2.57
1992	55795	11044	16.5	404	1127	2.79
1993	103254	31942	23.6	979	2727	2.79
1994	21371	2808	11.6	353	735	2.08
1995	26964	15240	36.1	78	218	2.79
1996	15148	4201	21.7	50	152	3.04
1997	15216	3105	16.9	40	106	2.65
1998	8214	2836	25.7	220	488	2.22
1999	12500	3450	21.6	111	254	2.29
2000	6669	2982	30.9	91	202	2.22
2001	14829	1198	7.5	68	167	2.46
2002	18441	4751	20.5	92	222	2.41
2003	27517	4371	13.7	197	446	2.26
2004	19715	4384	18.2	129	322	2.50
Mean ^b			22.4			2.64
% Change from:						
2003			33%			11%
Mean			-19%			-5%

^a Data supplied by Izembek National Wildlife Refuge and USGS Alaska Science Center.^b Mean excludes 2004.

Table 2. Historical winter productivity records for brant in the Pacific Flyway, 1983-2004.

Year ^a	Padilla/Samish Bays, WA ^b			Willapa Bay, WA ^c			Olympic Peninsula, WA ^d			Oregon Coast ^e			Combined		
	Ad.	Juv.	% Juv.	Ad.	Juv.	% Juv.	Ad.	Juv.	% Juv.	Ad.	Juv.	% Juv.	Ad.	Juv.	% Juv.
1983				982	166	14.5									14.5
1984				2605	251	8.8									8.8
1985															
1986	3731	292	7.3	1925	186	8.8	217	11	4.8						7.7
1987	3110	1242	28.5	997	196	16.4	1540	306	16.6						23.6
1988	2003	297	12.9	1167	184	13.6	1544	311	16.8						14.4
1989	4928	622	11.2	982	88	8.2	2231	232	9.4						10.4
1990	3047	837	21.5				2013	88	4.2						15.5
1991	2464	336	12.0	1189	126	9.6	913	123	11.9						11.4
1992	6294	669	9.6	944	88	8.5	839	46	5.2						9.0
1993	3032	1074	26.2				1299	265	16.9						23.6
1994	3771	197	5.0	937	97	9.4	1034	26	2.5						5.3
1995	1083	185	14.6				634	15	2.3						10.4
1996	1964	530	21.3	70	12	14.6	793	20	2.5						16.6
1997	1660	189	10.2				779	50	6.0						8.9
1998	2573	466	15.3	125	19	13.2									15.2
1999	1199	349	22.5	1818	183	9.1	386	29	7.0						19.3
2000	877	337	27.8				430	32	6.9						15.0
2001	1089	11	1.0				361	24	6.2						2.4
2002							368	28	7.1						7.1
2003	752	48	6.0				551	25	4.3				476	51	9.7
2004	647	85	11.6												6.5
Mean ^f			14.9			11.2			7.9						11.6
% Change from:															
2003			93%			N/A			N/A						78%
Mean			-22%			N/A			N/A						-5%

^a Surveys conducted some time between November of the stated year and February of the next year.

^b Data supplied by Russ Canniff and Washington Department of Wildlife. A high proportion of these birds are the "gray-bellied" variety.

^c Data supplied by Willapa National Wildlife Refuge and Washington Department of Wildlife.

^d Data supplied by Washington Maritime National Wildlife Refuge Complex.

^e Data supplied by Oregon Coast National Wildlife Refuge Complex.

^f Mean excludes 2004.

Table 3. Results of late-summer 2004 productivity surveys for trumpeter swans in Alaska. ^a

Area	Number of 1:63,360 Maps Surveyed	Date(s) Surveyed	Adults and Subadults				Total Swans	Broods	Mean Brood Size	% Juv. w/ Brood	% Pairs w/ Brood
			In Pairs	As Singles	In Flocks	Subtotal					
Koyukuk/Nowitna/ Kaiyuh Flats	13	8/5-9/2	462	69	213	744	257	85	3.0	25.7	33.3
Tanana Flats	5	8/24-9/7	116	14	15	145	35	16	2.2	19.4	27.6
Copper River Delta	11	8/23-8/25	446	27	497	970	189	59	3.2	16.3	26.0
Southeast Alaska	10 ^b	8/11-8/16	62	8	67	137	48	17	2.8	25.9	51.6
Total	39		1086	118	792	1996	529	177	3.0	21.0	30.8

^a Data supplied by Koyukuk/Nowitna NWR, U.S. Army Ft. Wainwright, USFS Cordova Ranger District, and USFWS Migratory Bird Management Juneau.

^b One map was only partially surveyed.

Table 4. Historical late-summer productivity records for trumpeter swans in Alaska, 1968-2004.^a

Year	Number of 1:63,360 Maps Surveyed		Adults and Subadults					Total Swans	Broods	Mean Brood Size	% Juv. w/ Brood	% Pairs w/ Brood
	In Pairs	As Singles	In Flocks	Subtotal	Cygnets	Swans						
1968	181	1320	108	496	1924	923	2847	257	3.6	32.4	35.4	
1975	285	2102	151	740	2993	1177	4170	378	3.1	28.2	35.4	
1978	13	284	36	130	450	116	566	37	3.1	20.5	26.1	
1979	13	264	26	229	519	164	683	46	3.6	24.0	32.6	
1980	297	3324	169	1766	5259	2437	7696	683	3.6	31.7	40.3	
1981	19	632	23	673	1328	547	1875	136	4.0	29.2	41.5	
1982	36	1164	97	443	1704	421	2125	138	3.1	19.8	23.4	
1983	46	1260	69	488	1817	903	2720	230	3.9	33.2	35.7	
1984	43	1358	125	780	2263	755	3018	230	3.3	25.0	33.1	
1985	425	5120	449	2204	7773	1686	9459	588	2.9	17.8	22.6	
1986	113	2560	184	678	3422	1349	4771	438	3.1	28.3	33.3	
1987	73	1640	108	760	2508	1030	3538	294	3.5	29.1	35.7	
1988	54	1610	103	1203	2916	1087	4003	322	3.4	27.2	39.1	
1989	63	1150	105	295	1550	488	2038	158	3.1	23.9	26.8	
1990	625	7056	647	2039	9742	3595	13337	1124	3.2	27.0	31.2	
1991	61	1968	123	936	3027	923	3950	322	2.9	23.4	32.1	
1992	80	1592	119	819	2530	825	3355	270	3.1	24.6	32.9	
1993	76	1766	127	663	2556	1080	3636	341	3.2	29.7	37.0	
1994	69	1982	128	1094	3204	1196	4400	374	3.2	27.2	37.2	
1995	674	7946	859	3184	11989	3834	15823	1218	3.1	24.2	30.1	
1996	50	1624	116	1042	2782	814	3596	256	3.2	22.6	30.5	
1997	46	1212	72	566	1850	584	2434	189	3.1	24.0	30.5	
1998	51	1702	104	740	2546	976	3522	281	3.5	27.7	32.4	
1999	27	508	36	212	756	228	984	71	3.2	23.2	26.0	
2000	733	9986	899	3049	13934	3223	17157	1149	2.8	18.8	22.4	
2001	22	1164	66	491	1721	531	2252	168	3.2	23.6	28.0	
2002	35	1118	111	521	1750	488	2238	165	3.0	21.8	28.3	
2003	55	2066	206	844	3116	1212	4328	407	3.0	28.0	37.5	
2004	39	1086	118	792	1996	529	2525	177	3.0	21.0	30.8	
Mean ^b									3.3	25.6	32.0	
% Change from:												
2003									0%	-25%	-18%	
Mean									-9%	-18%	-4%	

^a Complete statewide censuses were conducted in 1968, 1975, 1980, 1985, 1990, 1995, and 2000 (shaded in gray). In other years, surveys were conducted by various agencies to meet local objectives.

^b Mean excludes 2004.

Table 5. Historical winter productivity records for trumpeter swans in the Pacific Flyway, 1977-2004.

Year ^a	Alaska ^b			Vancouver Island, BC ^c			Skagit Valley/Port Susan, WA ^d			Combined Productivity % Juv.
	Ad.	Juv.	% Juv.	Ad.	Juv.	% Juv.	Ad.	Juv.	% Juv.	
1977							214	70	24.6	24.6
1978				384	134	25.9	218	76	25.9	25.9
1979	431	129	23.0	459	158	25.6	273	82	23.1	24.1
1980	167	65	28.0	499	211	29.7	310	127	29.1	29.2
1981							316	92	22.5	22.5
1982	110	35	24.1				339	56	14.2	16.9
1983	115	29	20.1	533	113	17.5	330	94	22.2	19.4
1984	109	79	42.0	1101	216	16.4	359	62	22.2	18.5
1985	95	14	12.8	1336	98	6.8	340	44	11.5	8.1
1986	146	40	21.5	1228	280	18.6	356	113	24.1	20.0
1987	146	52	26.3	1081	334	23.6	347	133	27.7	24.8
1988	164	52	24.1	1353	304	18.3	473	111	19.0	19.0
1989	239	55	18.7	1209	194	13.8	568	128	18.4	15.8
1990	266	57	17.6	1553	295	16.0	678	111	14.1	15.6
1991	696	267	27.7	1049	165	13.6	810	155	16.1	18.7
1992	578	169	22.6	1639	149	8.3	905	94	9.4	11.7
1993	667	322	32.6	1801	530	22.7	762	233	23.4	25.1
1994	562	190	25.3	1543	536	25.8	927	242	20.7	24.2
1995	294	61	17.2	1427	398	21.8	1187	239	16.8	19.4
1996				1307	195	13.0	1774	312	15.0	14.1
1997				1540	272	15.0	1569	249	13.7	14.4
1998	272	35	11.4	1427	286	16.7	2180	381	14.9	15.3
1999	338	59	14.9	1380	198	12.5	2384	336	12.4	12.6
2000	585	118	16.8	1612	275	14.6	2256	355	13.6	14.4
2001	191	79	29.3	1763	204	10.4	1936	366	15.9	14.3
2002	76	17	18.3	1659	263	13.7	2256	521	18.8	16.7
2003	580	151	20.7	1479	339	18.6	4158	912	18.0	18.4
2004	508	84	14.2	1886	377	16.7	3301	706	17.6	17.0
Mean ^e			22.5			17.5			18.5	18.7
% Change from:										
2003			-31%			-10%			-2%	-8%
Mean			-37%			-4%			-5%	-9%

^a Surveys conducted between November of the given year and February of the next year.

^b Data supplied by AK Dept. of Fish and Game, USFS Cordova and Yakutat, AK, USFWS Region 7 Migratory Bird Management, Peter Walsh, and Paul Meyers.

^c Data supplied by British Columbia Ministry of Environment, Land, and Parks, Comox Valley Naturalists Society, and Graeme Fowler.

^d Data supplied by Russ Canniff.

^e Mean excludes 2004.

Table 6. Historical fall productivity records (from ground counts) for emperor geese at Izembek Lagoon, AK, 1966-2004.^a

Year	Grouped Birds			Family Associations ^b		
	Adults	Juveniles	% Juv.	Families	Juveniles	Juv./Family
1966	699	265	27.5	132	331	2.51
1967	1457	585	28.6	66	215	3.26
1968	1195	585	32.9	40	112	2.80
1969	4149	2980	41.8	161	530	3.29
1970	9722	4933	33.7	383	1115	2.91
1971	8142	3458	29.8	484	1318	2.72
1972	4680	2270	32.7	210	641	3.05
1973						
1974	2025	377	15.7	50	130	2.60
1975	744	405	35.2	51	149	2.92
1976	1923	324	14.4	207	567	2.74
1977	996	683	40.7	108	302	2.80
1978	1395	495	26.2	62	188	3.03
1979	841	113	11.8	117	329	2.81
1980	1446	454	23.9	40	93	2.33
1981	1527	747	32.8	235	750	3.19
1982	1653	140	7.8	32	85	2.66
1983	1326	543	29.1	192	612	3.19
1984	2753	795	22.4	80	230	2.88
1985	2245	503	18.3	125	354	2.83
1986	3283	1381	29.6	266	794	2.98
1987	1706	808	32.1	305	993	3.26
1988	3884	1242	24.2	200	616	3.08
1989	3811	1136	23.0	145	455	3.14
1990	4002	1068	21.1	97	309	3.19
1991	8599	2882	25.1	147	480	3.27
1992	9291	1347	12.7	151	451	2.99
1993	13976	2176	13.5	161	441	2.74
1994	4658	792	14.5	301	702	2.33
1995	6434	1618	20.1	99	319	3.22
1996	3128	631	16.8	125	330	2.64
1997	1345	144	9.7	43	114	2.65
1998	1595	432	21.3	97	239	2.46
1999	2395	527	18.0	82	200	2.44
2000	1870	410	18.0	93	192	2.06
2001	1232	228	15.6	42	103	2.45
2002	4789	1842	27.8	260	696	2.68
2003	5744	785	12.0	218	439	2.01
2004	4600	1288	21.9	235	568	2.42
Mean ^c			23.3			2.81
% Change from:						
2003			83%			20%
Mean			-6%			-14%

^a Data supplied by Izembek National Wildlife Refuge, USGS Alaska Science Center, and USFWS Region 7 Migratory Bird Management.

^b 1979, 1981, and 1987 data include Izembek Lagoon and Alaska Peninsula; 1984-1995 data include Izembek Lagoon and Nelson Lagoon.

^c Mean excludes 2004.

Table 7. Historical fall productivity records (from aerial photos) for emperor geese on the Alaska Peninsula, 1985-2004.^a

Year	No. Photos	No. Birds	
		Aged in Photos	% Juvenile ^b
1985	155	3193	16.5
1986	311	6380	25.4
1987	703	10177	22.8
1988	483	11180	24.4
1989	390	12718	21.9
1990	474	13541	24.1
1991	412	14569	23.2
1992	403	14832	15.5
1993	255	5735	24.2
1994	479	16881	22.8
1995	361	11664	25.5
1996	182	10793	17.8
1997	205	11138	11.1
1998	336	16544	11.8
1999	392	13489	17.8
2000	263	7748	11.2
2001	365	11186	11.5
2002	402	6458	17.8
2003	421	8686	9.3
2004	370	6237	11.1
Mean ^c			18.7
% Change from:			
2003			19%
Mean			-41%

^a Data supplied by USFWS Migratory Bird Management, Anchorage and Fairbanks, AK.

^b Mean of % juvenile in each of 7 lagoons from photo samples, weighted by the population counts of those lagoons from an independent aerial survey.

^c Mean excludes 2004.

Table 8. Historical productivity data for dusky Canada geese on the Copper River Delta, AK, from July aerial surveys, 1971-2004.^a

Year	% Juvenile	No. Geese Sampled
1971	16.2	5717
1972	10.6	8193
1973	36.0	5873
1974	51.4	8199
1975	17.9	8990
1976	24.2	7092
1977	44.3	----
1978	24.8	----
1979	16.0	12700
1980	23.7	7500
1981	17.9	8740
1982	23.7	8473
1983	15.0	7740
1984	18.3	11913
1985	3.7	13780
1986	10.7	13309
1987	9.8	12448
1988	22.5	6917
1989	8.6	6114
1990	23.5	5530
1991	21.5	7098
1992	23.1	7633
1993	5.0	4542
1994	5.7	6977
1995	3.9	5818
1996	21.7	6329
1997	10.5	6253
1998	11.7	4919
1999	14.7	4156
2000	24.1	4397
2001	25.4	3165
2002	30.5	3708
2003	7.2	5929
2004	27.8	5678
Mean ^b	18.9	
% Change from:		
2003	286%	
Mean	47%	

^a Data supplied by Alaska Department of Fish and Game.

^b Mean excludes 2004.